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Terrorist Funding and Mobilization

How Do Remittances and Economic Inequality Impact the Occurrence of Terrorist Events?

Master's thesis in political science

Trondheim, fall 2014

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Abstract: There are few studies done on the use of remittances to finance terrorism. Remittances have previously been seen in connection with development policies but have in recent years been linked to funding of terrorist groups. The main objective of this study is to identify the relationship between remittances, economic inequality and terrorist events. Using remittance data from the World Bank the thesis aims to study how remittances, as well as underlying economic inequality might impact the occurrence of terrorist events. Using count data on domestic terrorist events and transnational terrorist events (by perpetrators country of origin) and applying negative binomial regression we study how remittances and economic inequality influence the occurrence of terrorist events. The findings support some of the hypotheses. There exists a relationship between increased transnational terrorism and remittance inflows, even when controlling for economic inequality. Contrary to previous studies no significant relationship can be found between domestic terrorism and remittance inflows. Vertical inequality, in the form of economic inequality, is significant across all domestic and transnational models. There are clear indications that the relationship between remittances and transnational terrorism warrants further study.

Contents

1 Introduction.....	1
1.1 Thesis outline.....	4
2 Theory	7
2.1 Terrorism as political violence.....	7
2.2 The Deprivation/Relative Deprivation approach.....	8
2.3 Rational actor approach.....	10
2.4 Greed versus grievance.....	11
2.5 Conceptualizing terrorism	12
2.5.1 Transnational and domestic terrorism.....	13
2.5.2 Correlates of terrorism.....	15
2.6 Conceptualizing remittances	16
2.6.1 Remittances studies: from developmental aid to potential terrorist funding.	18
2.6.2 Funding terrorism	18
2.6.3 Measuring remittances.....	21
2.7 Inequality	22
2.7.1 Measuring inequality	22
2.7.2 Lorenz curve and the Gini coefficient	23
2.8 Previous studies.....	24
2.9 Summary of arguments and hypotheses	26
3 Research design and method	29
3.1. Stochastic model theory	29
3.2 Negative binomial regression	30
3.3 Time Series Cross-Section Analysis.....	31
3.3.1 Assumptions	32
3.4 Variables	32
3.4.1 Dependent Variables.....	33
3.4.2 Remittances.....	33
3.4.3 Economic inequality	34
3.4.4 Endogeneity bias.....	35
3.4.6 Regime type	38
3.4.7 Ethno-religious fractionalization	39
3.4.8 Other control variables	41
3.5 Outliers.....	42
4 Results	47
4.1 Transnational terrorism	47
4.1.1 Benchmark model.....	47
4.1.2 Model variations and robustness checks.....	52
4.1.3 Summary of transnational models	55
4.2 Domestic terrorism	58
4.2.1 Benchmark model.....	58
4.2.2 Model variations and robustness checks.....	63
4.2.3 Summary of domestic models	65
4.3 Alternative models with year dummies.....	66
4.4 Main findings.....	66
5 Conclusion	71

5.1 Implications	72
References	75
Appendix	89
A.1 Variables and sources	89
A.2 Excluded squared terms from benchmark model	89
A.4 Tolerance.....	90
A.5 Fixed-effects model.....	90
A.6-7 Alternative models with year dummies.....	90
A.8- 11 Pearson's residuals	93
A.12 List of countries in the estimation sample.....	95

Figures

FIGURE 1. RELATIVE DEPRIVATION MODEL.....	9
FIGURE 2. GLOBAL TERRORIST EVENTS	15
FIGURE 3. FOUR LEVELS OF CAUSATION	16
FIGURE 4. GLOBAL FLOW OF REMITTANCES AND FDI, 1980-2005.....	17
FIGURE 5. LORENZ CURVE ILLUSTRATION.....	24
FIGURE 6. MARGINS PLOT: REMITTANCES	48
FIGURE 7. MARGINS PLOT: ECONOMIC INEQUALITY	49
FIGURE 8. MARGINS PLOT: GDP PER CAPITA	50
FIGURE 9. INTERACTION PLOT: OECD AND REMITTANCES	54
FIGURE 10. MARGINS PLOT: ECONOMIC INEQUALITY	59
FIGURE 11. MARGINS PLOT: FDI.....	60
FIGURE 12. CURVILINEAR GRAPH: GDP PER CAPITA.....	61
FIGURE 13. CURVILINEAR GRAPH: ETHNIC FRACTIONALIZATION	62

Tables

TABLE 1: DESCRIPTIVE, CONTINUOUS VARIABLES	36
TABLE 2. DESCRIPTIVE, DUMMY CODING OF COW VARIABLE	36
TABLE 3. NEGATIVE BINOMIAL REGRESSION. TRANSNATIONAL TERRORIST EVENTS, REMITTANCES AND ECONOMIC INEQUALITY. 1980-2005.....	45
TABLE 4. NEGATIVE BINOMIAL REGRESSION. DOMESTIC TERRORIST EVENTS, REMITTANCES AND ECONOMIC INEQUALITY. 1980-2005.....	57
TABLE 5 SUMMARY OF HYPOTHESES RESULTS	67
TABLE 6. ALTERNATIVE TRANSNATIONAL MODELS WITH YEAR DUMMIES.....	91
TABLE 7. ALTERNATIVE DOMESTIC MODELS WITH YEAR DUMMIES	92

1 Introduction

Are migrant remittances used to finance terrorism? In the months following the September 11, 2001 attacks, new counterterrorism measures were hastily enacted to hinder the financing of future terrorist attacks. President Bush issued an executive order on terrorist financing shortly after the attacks. The aim was to “starve terrorist of their support funds” and to “target the support structure of terrorist organizations, freeze the US assets and block the US transactions of terrorists and those that support them” (White House 2001). By freezing the funds of potential terrorists and blocking potential funding towards terrorist groups, the US government hoped to pre-emptively hinder the financing of terrorist acts and cull terrorist groups. Terrorist organizations are dependent on funding to effectuate their operations, which is why intercepting these financial flows are so central to counterterrorism activities (Schneider, Brück & Meierrieks 2011).

The aim of this thesis is to study the economic conditions for terrorism and examine the effect of potential funding flows to discern whether there is in fact a causal relationship between specific economic factors and terrorism, as much of the recent years counterterrorism measures rest on an assumption of such a causal relationship existing.

The remittance industry has been especially affected by these new counterterrorism measures. Migrant workers living abroad often remit some of their wages to their countries of origin, using the international banking system to transmit these remittances. Remittance transmissions are legal, but become illegal if the end use is funding of terrorist groups or individuals. Attempting to discern the end use can prove difficult. The process of remittance transactions has in recent years been under scrutiny, as banking firms transmitting the remittance funds have been accused of being “conduit[s] of terrorist financing” and allowing remittances to be used as funding for terrorism (Aufhauser 2003).

One of the earliest causalities of this new critical approach to remittance transactions was the Somali bank chain *al Barakaat*. The firm was accused of enabling financing to terrorist organization, which led to the freezing of all their global assets by the US Treasury Department in 2003. As the largest transmitter of remittances in Somalia, the closing had a great impact on local communities in Somalia that depend on financial transmissions from the diaspora abroad.

In countries such as Somalia, remittances are the main source of income for many households. Estimates have found that approximately \$1.3bn is transferred into Somalia annually; outperforming international aid into the region and representing over half of the countries' gross national income (Watkins 2013). The increased regulatory system of global finances could prove to have great ramifications for developing nations. Stricter controls and difficulties in transferring remittances can prove detrimental in poorer communities, as remittances from the diaspora represent a large percentage of the GDP. Whether remittances are *in fact* used to fund terrorism will therefore have big implications for future policy decisions. Remittances are one of the great economic flows today and any attempts at restraining or hinder these transmissions should not be taken lightly.

Identifying the correlates of terrorism is a central part of terrorism studies and the field has seen a growing interest in the role of economic factors in influencing terrorist mobilization. How do economic factors influence the occurrence of terrorism? And what economic pre-conditions influence the occurrence of terrorism? The aim of this thesis is to test for a potential causal relationship between remittances and terrorist mobilization.

There is little systematic analysis done to assess the effect of remittances on terrorism. Only two larger quantitative studies exist to date on the use of remittances to finance terrorist groups. The Elu and Price study focused only on the sub-Saharan region and found that much of the remittances sent were used to fund terrorist acts. Mascarenhas and Sandler (2013) criticized these findings as unrealistic. Their 2013 study found a connection between terrorism and remittances, but nowhere near the numbers presented by Elu and Price. Our paper seeks to expand on this, by looking also at the pre-existing levels of economic inequality. Is it the remittances in themselves that causes terrorism or is economic inequality also an important underlying factor?

Poor economic conditions have often been ascribed a central role in explaining the existence of terrorist groups. Previous studies on poor economic conditions indicate that poverty is unlikely to have a mobilizing effect on terrorists (Piazza 2006; Krueger & Malecková 2003). Absolute poverty might not influence terrorist mobilization, but this thesis will argue that economic inequality, as a form of relative deprivation, is on the other hand an important determinant of terrorism. Economic inequality will be included in our analysis to see whether

the underlying economic inequality or remittances help explain the occurrence of terrorism and terrorist mobilization.

Relative deprivation theory describes how a gap between the expected and the obtained levels of welfare leads to feelings of discontent. By using relative deprivation as a theory of political violence, the discrepancy between expected and obtained level of economic welfare should be a determinant of terrorist mobilization. The thesis will also base its theoretical foundation on the rational actor school, where the actions of terrorists are viewed as explainable through cost-benefit decisions.

A time series cross-section analysis of terrorist events in 185 countries over a twenty-five-year period, from 1980 to 2005 will be analyzed. The statistical models will study both types of terrorism: transnational terrorism and domestic terrorism. The first statistical models will use transnational terrorist events as the dependent variable, before applying domestic terrorist events. Domestic terrorism represents the most common form of terrorism, but is underrepresented when it comes to large quantitative studies, which focus nearly exclusively on transnational terrorism (Cuenca & Calle 2009).

The remittance data from the World Bank is country level and accounts for remittances as a percentage of the country's GDP. Ideally, micro and household level data on remittances should also have been included but as there exists little to no quantitative data on the end use of remittances in the receiving countries. This obfuscates the exact causal path between remittances and terrorist mobilization. While the results are circumstantial (i.e. that countries that have high remittance inflows are also prone to more terrorist mobilization), the findings are interesting and an important contribution to discerning whether remittances are connected to countries with higher terrorist mobilization. After applying different controls to the models this causal link is still significant and present, therefore establishing a plausible relationship between remittances and terrorism.

The relationship between economic inequality, remittances and terrorism is largely unstudied. This may in part be explained by the lack of solid data on economic inequality and up till recently, the lack of good data on remittances. This thesis aims to fill that lacuna by studying how remittances and economic inequality impact terrorist mobilization.

The paper is the first global study on the relationship between remittances, economic inequality and the occurrence of terrorism. Earlier terrorism research has been criticized for limited methodological approaches and especially for the lack of applied inferential statistics (Silke 2007). The depth and breadth within the discipline has steadily improved and the terrorist attacks on 9/11 led to an upsurge of interest in the field. The use of statistical analysis and inferential statistics is particularly on the rise; nearly 26 percent of all articles published on the subject in the major journals now use a quantitative approach (Silke 2007).

The main findings of this thesis indicate that remittance flows are significantly associated with increased terrorist mobilization within a country, at least in the case of transnational terrorism. Surprisingly there was no significant relationship between domestic terrorist events and remittance inflows, contradicting the previous findings to Mascarenhas and Sandler (2013). While both remittances and economic inequality has strong explanatory powers in the transnational models, only economic inequality was significant of the main independent variables in the domestic models.

1.1 Thesis outline

The aim of this thesis is to investigate whether remittances and economic inequality have any effect on the mobilization of terrorists. The thesis is divided into four principal sections, following the introductory chapter. Chapter 2 lays the theoretical groundwork for the thesis. Remittances and economic inequality have previously been studied separately and this research is shortly presented, as well as political violence and terrorism as a discipline. The chapter begins with placing terrorism studies within the larger field of political violence in 2.1 Subsection 2.2 and 2.3 presents the two main theoretical approaches: the deprivation school and the rational actor approach. The academic discussions on how these two schools place themselves in the debate between “greed” and “grievances” as explanations for terrorist mobilization will also be shortly discussed in 2.4. Subsection 2.5 attempts to conceptualize terrorism and study the main approaches to terrorism research and its leading paradigms. Subsection 2.6 examines remittances as a global phenomenon and the paradigm shift in studying remittances since 9/11. Challenges related to capturing the size of remittance flows are also touched upon. Remittances can flow through both formal and informal channels, and how these channels influence the surveying of remittances. The section also reviews research that claims that remittances are used to fund terrorism. Subsection 2.7 deals with the issue of

economic inequality and the argument of relative deprivation. Measuring income inequality can prove difficult and the subsection will therefore look to possible ways of measuring based on previous studies. Subsection 2.8 will look briefly at previous studies before the chapter concludes in 2.9, where the chapters' main arguments are presented and the five main hypotheses presented.

Chapter 3 examines the methodological background of the thesis, more specifically the models, variables and the underlying logic of stochastic model theory. The subsection 3.1 gives a short overview of the statistical method, as well as a closer look at the underlying logic of stochastic model theory. Negative binomial regression, which is commonly used on overdispersed count data, will get a short introduction in subsection 3.2. In 3.3 the time series cross sectional analysis will be presented, as well as some of the underlying assumptions. Subsection 3.4 features the variable choices, starting with the dependent variable, then the main independent variables and ending with the control variables. The construction of the data will also be briefly touched upon.

The results from the statistical models are presented in chapter 4. The chapter will first present the results from the transnational terrorist model and the necessary robustness checks in 4.1, before moving on to the domestic terrorist models in 4.2. The main findings will be thoroughly discussed and the estimations from both models contrasted and compared. Additional robustness checks and alternative models will also be shortly presented in 4.3. These have been included to control the findings in the original benchmark models

Concluding remarks round out the thesis in chapter 5, with a brief look at the implications of the results as well as the main contributions of the thesis to the field of terrorism research.

2 Theory

The theoretical foundation of terrorism studies has developed from theories on collective action and political violence (Schmid & Jongman 2005[1988]). Much of the theory presented in this chapter hails from this tradition. Chapter 2 provides a general overview of the literature and previous studies on remittances, economic inequality and how they relate to terrorist mobilization. The first section of chapter two will present the two main theoretical approaches and how they relate to the thesis. The next section will attempt to conceptualize terrorism and the differences in transnational and domestic terrorism. The third section explores the concept of remittances and the shift within remittance studies. Before the events of 9/11 the discipline focused mainly on remittances as a force for development and “self-aid”. The “War on Terror” has created a paradigm shift within policy and academic life, where remittances are now discussed as a possible source for funding terrorism. As chapter 2 aims to provide a solid theoretical foundation for a series of statistical models it will also be necessary to discuss the quality of the available remittance data.

The effect of economic inequality and how feelings of inequity can impact the occurrence of terrorist events will also be examined. Economic inequality is a normative term and the section will therefore also present a clear theoretical basis for the concept when applied to our analysis. Previous studies will also be shortly presented before rounding out the chapter with a summary of the main arguments and formulating five hypotheses that the statistical models aim to answer.

2.1 Terrorism as political violence

Political violence is not limited to violence committed by political actors or for a political cause, but encompasses a much broader spectrum of violence. According to Bloxham and Gerwarth (2011) political violence expresses itself in four distinct ways: 1) Violence in the form of military actions such as civil war; 2) genocidal violence or ethnic cleansing; 3) violence from terrorism or state repression; and 4) revolutionary or counter-revolutionary violence. There are many similarities and shared dynamics between all four forms, though each manifestation also has unique traits (Bloxham & Gerwarth 2011).

Some of the literature used in this thesis is on civil war. Civil war and terrorism represent different manifestations of political violence, but share some commonalities when it comes to

the underlying logic, as using violence against civilians to shape their political behavior is common for both civil war actors and terrorists (Kalyvas 2004).

2.2 The Deprivation/Relative Deprivation approach

Economic inequality refers to a specific form of inequality related to wealth and income distribution. Chester (1976) argues that poverty is not directly related to crime rates, but rather a *perceived relative deprivation* amongst those committing the crimes. An individual might not experience absolute poverty, but if the person perceives their own economic position as less than another, the sense of relative deprivation might still impact their general welfare. Studies indicate that there is no strong empirical evidence to support the “rooted-in-poverty” thesis and a direct connection between poverty and terrorism (Piazza 2006: Krueger & Malecková 2003). Rather it is the feeling of impoverishment relative to someone else that leads to criminal behavior (Chester 1976).

The term *relative deprivation* was initially used in a study of American soldiers during World War Two. If soldier A is deprived of X, comparing himself to soldier B who has X, soldier A is “relatively deprived” compared to the point of reference (Stouffer 1949). Runciman further developed the concept in his study of social inequality in Britain.

We can roughly say that [a person] is relatively deprived of X when (i) he does not have X, (ii) he sees some other person or persons, which may include himself at some previous or expected time, as having X (whether or not this is or will be in fact the case), (iii) he wants X, and (iv) he sees it as feasible that he should have X (1966:10)

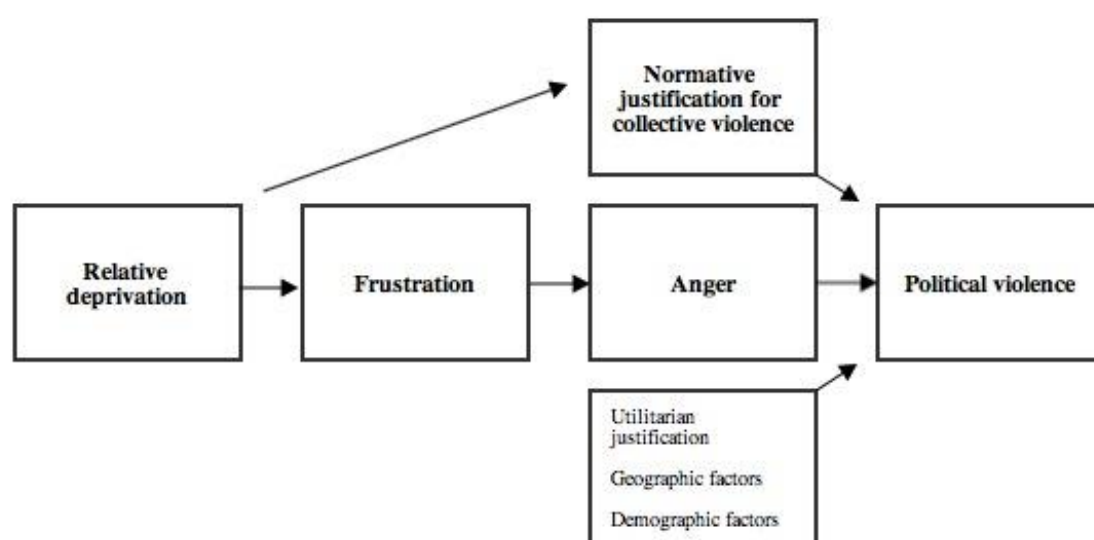
Applying the paragraph above to the case of economic inequality, an individual might expect certain levels of economic equality, only to find that the actual level is not bestowed upon them. Relative deprivation is simply a term used to illustrate the tension created by discrepancies in peoples’ goals and their actual achievements, compared to other groups or individuals (Gurr 1970). Gurr argues that there is an increased propensity for political violence in societies where this feeling of deprivation is systematic and ingrained in the fabric of society. So-called “deprivation-induced discontent” stemming from economic inequality is therefore central in explaining political violence (1970:13). Implicit in this argument is a

positioning of socio-economic justice as the motives behind violent opposition movements (Lichbach 1990).

The deprived actor school (DA) attempts to describe how this sense of deprivation is linked to violent actions. Much of relative deprivation theory is based on psychological theories that attempt to explain how this discontent turns to dissent through different cognitive processes (Jakobsen 2007). It is through these processes that the deprivation turns into grievances and these grievances result in violent behavior (Gurr 1970) (See Fig.1). Gurr refers to this as the *frustration-aggression mechanism*, which is an important factor in explaining human nature's predilection for collective violence (1970).

The view that economic inequality is a source of conflict can also be found within the deprived actor school (Jakobsen 2007). Societies plagued with unequal distribution of wealth are believed to be at greater risk of conflict than more egalitarian societies. The ordinary DA approach to relative deprivation is based on an actor judging their gains relative to one's own expectations. In the case of inequality, the causal mechanism work differently, as inequality is judged relative to other actors within the same society (Regan and Norton 2005). The relationship between economic inequality and political violence also referred to as the *Economic Inequality-Political Conflict (EI-PC) nexus* (Lichbach 1989; Piazza 2006).

Figure 1. Relative deprivation model



Source: Jakobsen (2007) [Gurr 1970].

2.3 Rational actor approach

The classical depiction of terrorists as madmen and irrational actors does not have basis in any empirical evidence. Most studies on terrorist behavior have found their actions to be internally consistent with their goals and objectives, which indicates a large degree of rationality on part of the terrorists (Stohl 1979; Caplan 2006). The idea of terrorists as rational actors has their basis in economic theory. The economic model of crime views criminals as rational actors who are able to maximize their utility while at the same time weighing the cost-benefit of their actions (Becker 1968). Extending this economic model of crime to terrorism has been increasingly common within the field of terrorism studies (Krueger and Malecková 2003). Most economic analyses of terrorism have employed rational-choice models as their theoretical foundation (Enders & Sandler 2002; Caplan 2006). Rational actor theories have developed as a response to the deprivation school and are critical of deprivation/grievances as sufficient explanatory factors for the occurrence of political violence (Jenkins 1983; Zimmerman 1983).

Rational actor theories view resource mobilization and opportunity structures as paramount mechanisms for understanding the occurrence of political violence (McCarthy & Zald 1977; Eisinger 1973). If, as stated above, we view all actors as rational and follow rational actor logic the mobilization of resources or opportunities would weigh into a terrorists cost-benefit calculus. Lichbach has used a game-theoretic approach to illustrate how a rational actor would not rebel against inequality, without also obtaining some form of reward for their participation (1990). As rational actors, or “homo economicus”, terrorists are able to rank different possible tactics on the basis of risk, time and the probability of being stopped by the authorities (Sandler, Tschirhart & Cauley 1983; Gurr 1979). By weighing the risks against the benefits terrorists are able to make rational choices. This is also corroborated by extensive empirical studies that have found behavior amongst terrorist that indicate a rational response to risk factors (Mickolus 1976; Sandler et al 1983; U.S Central Intelligence Agency 1981). Terrorists have proven flexible in their tactics and a willingness to adapt to changes in measures aimed at eliminating terrorist behavior. An example of this is the installation of metal detectors at airports and stricter controls at governmental buildings. These measures have not been able to lower the risk of terrorist events, but simply induced the terrorist to choose other forms of terrorism where the costs have not risen (Mickolus 1980; U.S. Central Intelligence Agency 1981). While their acts can be deemed immoral and wrong, they are internally consistent with the group’s motives and goals.

The rational actor approach is popular amongst political scientist studying terrorism and terrorist activity¹. While the goals of terrorists vary, it is not the goal that indicates rationality, but rather how the terrorists pursue these goals when faced with, inter alia, the above-mentioned limitations. This makes terrorist events a form of political behavior done by a rational actor, as terrorists are able to efficiently exploit their limited resources to reach their goals (Crenshaw 1981; Krieger and Meierrieks 2011). The act of terrorism is therefore simply a logical means to an end.

2.4 Greed versus grievance

Recent studies on political violence have focused on two main explanatory factors in explaining the occurrence of political violence (Murshed 2007). As mentioned previously, the literature on political violence is not always related directly to terrorism and while not all civil wars are plagued with terrorist attacks, there are some of the same underlying logic found in civil war violence and violence generated by terrorists (Kalyvas 2004). The greed argument is based on rationalist theory and focuses on the *opportunities* for political rebellion (access to funds and natural resources) (Østby 2008). Collier and Hoeffler, in their 2004 article “Greed and Grievances in Civil War”, contended that factors explaining the occurrence of civil war were “greed-driven” rather than “grievance-driven”. Their study found that economic variables have a stronger explanatory power than social variables. The view of political violence as being grievance driven focuses on the *motives* for rebelling (inequality, ethnic cleavages etc) and is based to a large extent on theories from the relative deprivation school (Østby 2008; Collier & Hoeffler 2004). Jakobsen argues that the greed vs. grievances debate is a continuation of the rational actor vs. deprived actor arguments.

As Østby points out, the “greed-grievances” debate should not be seen as an “either-or” discussion but rather as an interaction between the two (2008:145). The focus should instead be on synthesizing the two explanations, combining competition for resources (greed) with historical grievances to understand ongoing political violence (Murshed 2010; Murshed 2002). The two might be complimentary, with both greed and grievances providing motivating factors for political violence.

¹ Anderton & Carter 2005; Shughart n.d; Sandler, Tschirhart & Cauley 1983; Caplan 2006

It is also necessary to understand how these two theoretical approaches are relevant for our research. The two main independent variables of this thesis, migrant remittances and economic inequality, each represent a side of the DA-grievance and RA-greed argument. Economic inequality is a grievance and derived from the DA school theory that strong enough grievances will lead to political violence. High levels of income inequality will lead to feelings of deprivation and is, following the logic of Gurr's model of deprivation, is an important cause of violence (see Fig.1). Migrant remittances, on the other hand, function as a form of economic stimulus and create an *opportunity* for rebellion, following the logic of the RA and greed argument.

2.5 Conceptualizing terrorism

The phenomenon of terrorism is a complex one, involving a diverse set of groups and individuals with radically different reasoning behind their actions. Terrorism as a concept is highly politicized, with strong negative connotations, making it a powerful weapon, as those labeled as such face great political costs and lack of legitimacy. As Lutz and Lutz point out, taking the same violent action and redefining it as terrorism alters the perception of said action (2004). Instead of defining someone as a terrorist, but rather as a freedom fighter, a rebel or revolutionary, it is implied that the violence committed is done so for the greater good and is therefore a moral action. The term can therefore be used to ascribe violence acts specific values and because of this value-laden nature the term is often wielded as a political weapon. Consequently, it is highly necessary to conceptualize the term.

The terminology for *terrorism* should seek to be as neutral as possible and separate moral evaluation on the use of violence and rather aim for an objective understanding of the action (Combs 2000). The field of terrorism studies has generated many different understandings of the term terrorism. For the purpose of this paper we will apply one of the most widely used definitions, formulated by Enders and Sandler. Enders and Sandler have attempted a broad definition that encompasses the complexity of terrorism:

Terrorism is the premeditated use or threat to use violence by individuals or subnational groups against noncombatants in order to obtain a political or social objective through the intimidation of a large audience beyond that of the immediate victims (2006:3)

This is a broad definition that encompasses the complexity of terrorism, but in addition it is important to establish three facts before determining whether a violent action constitutes as terrorism: who is the *victim*, the *perpetrator* and the *audience*? Whether an act of violence can be defined as a terrorist act is dependent on whether *the victim* is classified as a civilian or military force. An example of this is the Israeli government, which defines an attack against military targets as terrorism, while most countries do not define attacks against the military as such as long as it is part of an occupying force (Enders & Sandler 2006). The data for the dependent variable used in this paper follows the same tradition and does not count attacks against occupying forces as an act of terrorism.

The *audience* of a terrorist attack is the group that the event is meant to terrorize. Terrorist bombings on for example public transportation is meant to create anxiety amongst the general public; as the randomness of the attacks leads to uncertainty and a state of unrest. *The victims* of the attack are therefore not a goal in themselves but rather the means to reach a larger audience. Reaching a larger audience is central to terrorists, as they attempt to bypass regular political channels and enact change through violence or the threat of violence (Horgan 2005).

Defining the *perpetrators* can prove challenging. Attacks by the state or government against its populace can be similar to an act of terrorism, but Enders and Sandler separate terrorism and *state terror*. Following their definition, only individuals or subnational groups can be the perpetrators of terrorism. The focus of this thesis will be on the perpetrators as it aims to study the economic determinants of terrorist mobilization and events.

2.5.1 Transnational and domestic terrorism

As the statistical models in this thesis aim to study the effects of remittances and economic inequality on both transnational and domestic terrorism, it will be necessary to differentiate between the two. Transnational terrorism can be one of two things; 1) attacks by foreign terrorists against domestic targets within a country or 2) domestic terrorists attacking a foreign target within a country. The attacks of on September 11, 2001, was committed by foreign nationals on U.S soil and is therefore an example of the first kind of transnational terrorism. The transnational dependent variable used in the statistical models are coded by Mascarenhas and Sandler (2013) but based on data material from the *International Terrorism*:

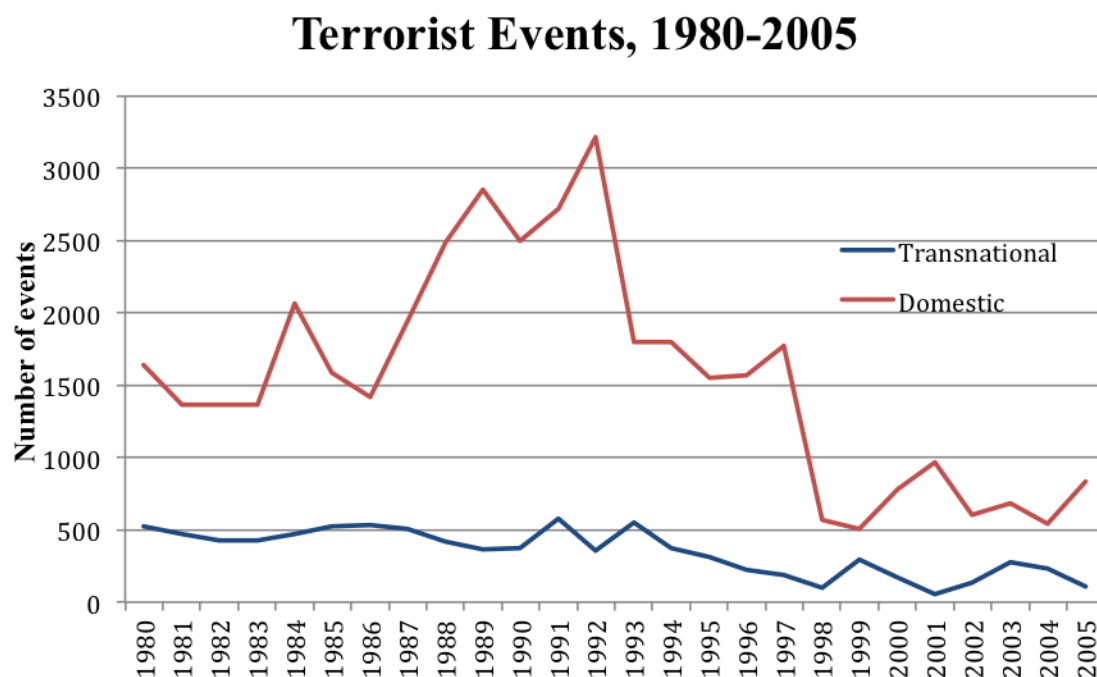
Attributes of Terrorist Events (ITERATE) database. Therefore beneficial to apply their definition as well:

[...] the use, or threat of use, of anxiety-inducing, extra-normal violence for political purposes by any individual or group, whether acting for or in opposition to established governmental authority, when such action is intended to influence the attitudes and behavior of a target group wider than the immediate victims and when, through the nationality or foreign ties of its perpetrators, its location, the nature of its institutional or human victims, or the mechanics of its resolution, its ramifications transcend national boundaries (Mickolus, Sandler, Murdock & Flemming 2012: xii).

The ramifications of transnational terrorism bypasses traditional borders, either because of the nationality of the perpetrators and victims differ, or because the location of the event differs from that of the perpetrators nationality.

Domestic terrorism on the other hand, has much less convoluted interactions between the different actors. Terrorism is classified as domestic if it is “homegrown”, that is, if both the target, the venue of the attack and the perpetrators all hail from the same country. A domestic terrorist is someone who engages in terrorist activities within their own country of origin. Domestic terrorism will therefore only have direct consequences for the venue country (Enders, Sandler & Gaibullov 2011). The American Federal Bureau of Investigation (FBI) adds to this definition that the perpetrators not only operate in their homeland, but also that they *lack foreign direction* (Jarboe 2002). Consequently, domestic terrorist attacks do not include attacks that are part of larger international groups, such as Al-Qaeda. Studying both types could yield interesting results, as the determinants of transnational terrorism might differ from those of domestic terrorism. Domestic terrorism occurs at much higher rates than transnational terrorism (see Fig.2) but is still, as mentioned introductory, understudied compared to transnational terrorism (Cuenca & Calle 2009).

Figure 2. Global terrorist events



Author's calculations. Source: WDI data 2013

2.5.2 Correlates of terrorism

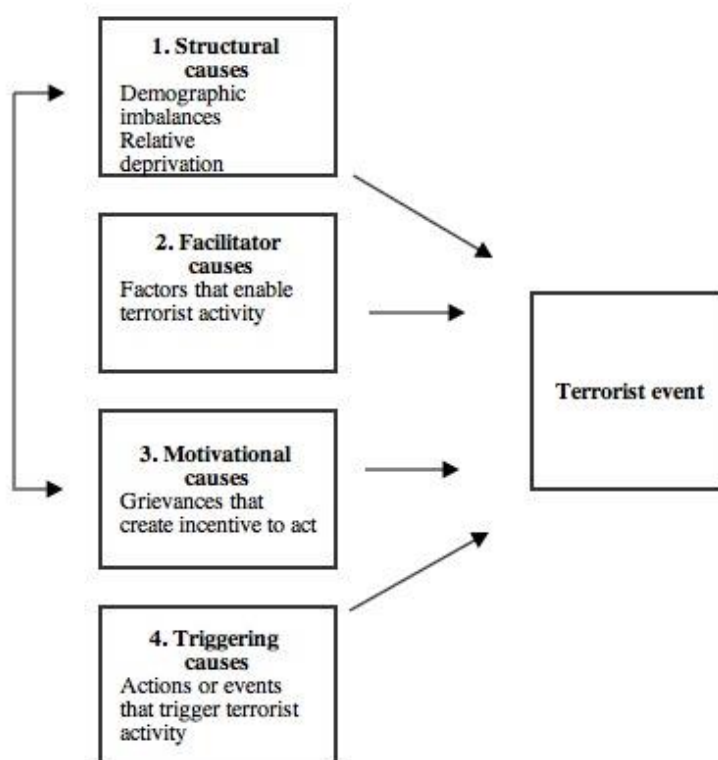
The main goal of counter-terrorism measures is to understand the necessary factors and conditions for terrorists to mobilize (O'Neill 2002). In order to implement efficient counter-terrorism policies figuring out these correlates are essential, *condicio sine qua non*.

Nonetheless, identifying the factors that influence the occurrence of terrorist attacks has proven difficult. The underlying determinants of terrorist mobilization vary from country to country and within different groups (O'Neill 2002). This variation across countries makes it difficult to identify common denominators on a global scale.

Bjørge has defined four levels of causation when discussing the preconditions or precipitants of terrorism (2005). These four levels are: 1) structural causes, which affect individuals but can be abstract to understand, as they exist on a macro level; 2) facilitator causes, are those factors of modern society that enables terrorist activity; 3) motivational causes are the grievances that actors experience which motivates them to act and finally; 4) triggering causes, which are the events or actions that trigger terrorism (see Fig.3).

The thesis will focus mainly on the structural and motivational causes. Demographic imbalances, class structures and relative deprivation are all typical structural causes of terrorism and will be studied closely in the thesis. The motivational causes are often structural causes that have been translated, through ideologues and leaders, into persuading arguments for people to act. Motivational causes can also be seen as the symptoms of more structural issues. Bjørge has also described motivational causes as manifestations of structural issues (2005).

Figure 3. Four levels of causation



Source: Adapted after Bjørge's levels of causation (2005).

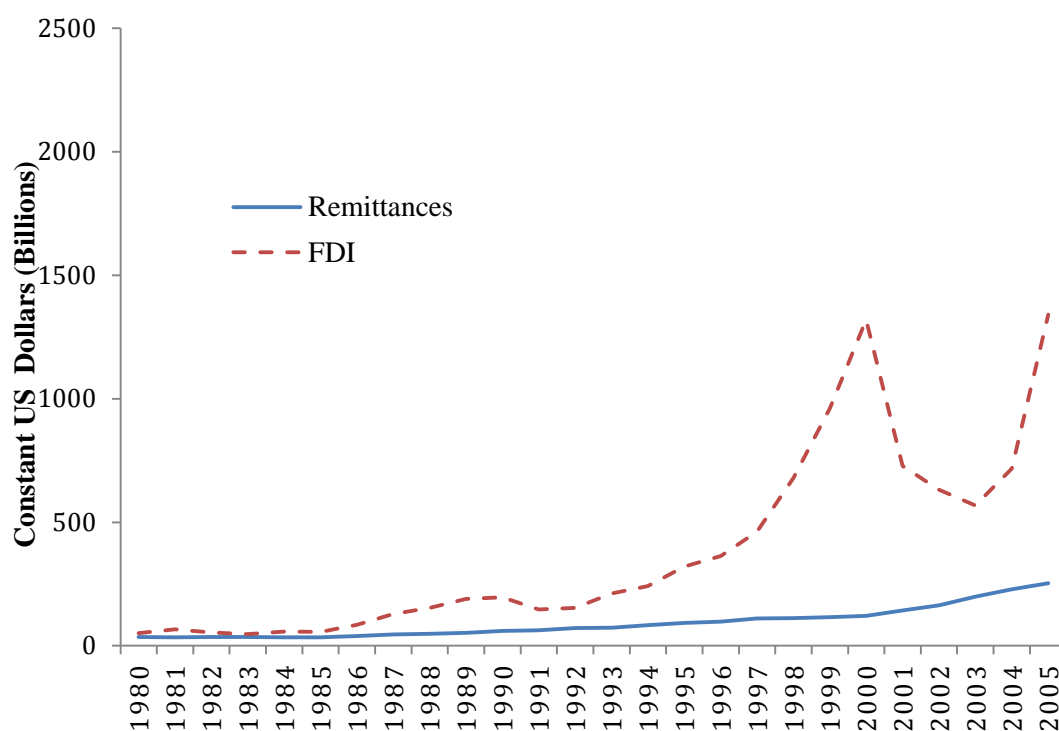
2.6 Conceptualizing remittances

Labor migration is one of the main economic strategies chosen by the relatively poor and plays a central role in many developing nations (Eversole 2005). These labor migrants are a central feature of modern globalization and their migration sees those of little economic means travel from densely populated areas (with labor surplus) to less populated, and often

richer, areas (with labor shortage). This transfer of human resources inevitably leads to a transfer of economic resources, from the migrants abroad to their homesteads (Brown 2006). These economic resources are the sum of money migrant workers transfer back home and are, as Brown (2006) points out, simply a “resource transfer” from a rich area to a poorer area, done through the migrants and their families instead of through larger organizations. Within economic literature these economic flows are known as remittances.

These remittance flows (see Fig.4) have increased exponentially in the last few decades, as globalization and migration has sped up and made cross-border movement easier. Remittances are today a central source of financing, especially in poorer parts of the world and are in many countries outperforming more traditional economic capital flows. New estimates from the World Bank indicate that global remittance flows reached \$542 billion in 2013 (2013).

Figure 4. Global flow of remittances and FDI, 1980-2005.



Author's calculations. Source: WDI data 2013

This makes remittances one of the largest and most stable global financial flows, only outsized by foreign direct investments (FDIs). Remittances are especially important for economies in developing countries where they represent a large percentage of the GDP. In

countries such as Somalia remittances largely outpace traditional aid and equity flows (Ratha 2005; Keese 2005). These transfers have in recent years been increasingly seen in connection with funding of terrorist groups.

2.6.1 Remittances studies: from developmental aid to potential terrorist funding.

Remittances are in essence a large inflow of capital into a market. Earlier studies show that increased remittances lead to a rise in the household income of the migrant families and increased purchasing power (Acosta, Larrey & Mandelman 2009). How the remittances are utilized varies greatly, but previous studies have found that the remitted funds are used mainly for *current consumption* or *asset accumulation*, in effect to cover basic living expenses and ensuring investments and savings (Taylor 2004; Brown 2006). The fact that migrant workers remit to their countries of origin is described by Ratha as a form of *home bias* in investment (2005). Migrants are more likely to continue to invest in their country of origin as they seek to improve the quality of life for their families and their local communities. Remittances have also proved themselves to be a resilient financial flow during the financial crisis, when they remained stable while other flows, such as FDIs, declined (Afram 2012)

Much of the earlier literature on remittances has focused solely on its role as a contributor to development and its benefits for the local communities². The terrorist attacks on September 11, 2001 and the subsequent “War on Terror” has seen a paradigm shift, with increased focus on remittances role in global financial crime and funding of terrorist activities, rather than aiding development. This can be seen in recent years counter-terrorism policies that focus increasingly on the idea that remittances are used to fund terrorist attacks (Elu & Price 2011; Vaccani 2011; Williman 2001; Mascarenhas & Sandler 2013).

2.6.2 Funding terrorism

Large-scale terrorist operations such as the 9/11 attacks, as well as smaller attacks all require financing. Most terrorist cells are independently financed and funds are transferred to the cells in small amounts, to avoid suspicion (Schneider 2004). Schneider estimates that terrorist groups such as *Al-Qaeda* have an annual budget somewhere between \$20 and \$50 million (2009). These funds are mainly derived from criminal activity such as drug trafficking and

² Russell 1992; Adams 1991; Rubenstein 1992; Taylor 1999

financial support from supporters. International efforts to squash the financing of these terrorist organizations have been done in an attempt to reduce terrorist activity.

The fight against terrorism follows the logic of the War on Drugs. Much in the same way that the American government has focused on cutting on the financial support to the drug cartels, the FATF and the US government have mainly focused their efforts on attacking the banking systems that enable transfers of funds to terrorist groupings. Counter-terrorism measures in the War on Terror have attempted to freeze and block the financial assets of alleged terrorists, in hopes of hindering terrorist attacks. Disrupting the financial flows of terrorist organizations is not a new idea and was used diligently by the British government against Northern Irish resistant groups during the 1970s and 80s (Anderson 2013).

The financing of terrorism can be done in different ways. Illegal funds can be transferred electronically, across borders with minimal control. In the case of remittances the funds are viewed as legal in the banking system, but become illegal if their end use is terrorism. Attempting to differentiate between them and discerning their end use can prove difficult.

Monitoring of financial systems has been part of U.S. law since the implementation of the Bank Secrecy Act in 1970. Following the 9/11 attacks, the act was further strengthened by the implementation of the Patriot Act. Shortly after the attacks, an executive Order on Terrorist Financing was issued by President Bush, intending to “starve terrorist of their support funds” and to “target the support structure of terrorist organizations, freeze the US assets and block the US transactions of terrorists and those that support” (White House 2001).

The Financial Times reported in 2001 that the Al-Qaeda attacks on September 11th, 2001 were financed with funds passed through a network of banks, including France’s Credit Lyonnais, as well as other big European Banks (Willman 2001). The money-transfer company Western Union was also implicated, as it was used to transfer terrorist funds from the United States to the United Arab Emirates (Business Week 2001).

The United States and the United Kingdom have had some limited success in freezing the assets of groups such as the Taliban, but with the resources required, the strategy can prove too time consuming and costly (Rider 2004). In addition the strict regulation imposed might exclude legitimate businesses and low income, undocumented groups and individuals in both

developed and developing countries (Loughlin 2012). Counter terrorism measures that aim to hinder transactions makes it increasingly difficult for migrants to share their wages with their families “back home” (Vleck 2006)

As remittances are only illegal if used to fund terrorism the end use is highly important. The new regulatory climate following the War on Terror has put the nexus on the banking sector to discover possible terrorist funding within their own systems.

Investigations into the Somali bank *al Barakaat* found no evidence of a connection between the money transfer chain and Al-Qaida, but that did not deter the Treasury Department from continuing the hardline approach to financial transactions (Roth, Greenburg & Wille: n.d). In 2013 it was announced that Barclays, one of the last European bank providers of remittance transfers, was closing the accounts belonging to 146 of its 165 remittance transfer partners (Popham 2013). Amongst these was Dahabshiil, the largest money transfer operator in the Somali region (since the closing of Al-Barakaat) (Ring 2013). Barclays decision to close the Dahabshiil account came on the heel of a \$1.9bn fine given to the banking giant HSBC. Inadequate regulatory systems and lack of controls of monetary transfers was cited as the reason behind the enormous fine given to HSBC by the US authorities (Worstell 2013). The closing of these remittance channels and attempts at closing others have been faced with criticism from interest groups such as Oxfam, as well as Somali organization the Heritage Institute who claims that attempts at closing remittance channels will “have a deleterious impact on hundreds of thousands of people across Somalia” (The Economist 2013; The Guardian 2013)

These cases are not unique, as many American and Canadian banks are unwilling or unable to handle remittance traffic to countries such as Somalia. Many developing countries lack the necessary infrastructure to comply with standards of transparency required by the new regulations, but are at the same time the countries most vulnerable to these new hindrances in remittance flows (Omer n.d)

Within the European Union the Financial Action Task Force (FATF) was established to monitor and make recommendations on combating potential threats to the international financial system. Terrorist financing has in recent years been one of their main concerns.

The FATF have applied different measures to avoid misuse of remittance channels, such as lobbying for stronger regulatory systems and other initiatives intended to hinder terrorist groups from receiving funds through remittance transfers from migrants abroad (FATF 2002).

2.6.3 Measuring remittances

The transmission of remittances goes through specific channels. These remittance channels function as an economic bilateral flow, comprised of four points (IMF 2009). The first is the *sender*, who transmits the money; then the *intermediaries* and their payment interfaces in both the *sending* and *receiving* country; before reaching the *recipient*. Together these four points comprise the channels. The focus of our analyses is on the last point; the recipient and the recipient's country (IMF 2009).

These channels are often classified in the remittance literature as either *formal* or *informal* channels. Though the name might indicate it, there is not a clear-cut difference between the two. Formal channels are authorized to handle money transfers and are often banks or other registered institutions for money transfers. The informal channels are legal, but operate outside of the more formal regulations. Often in these cases the intermediaries are not formal businesses. Whether a remittance channel is formal or informal can differ from country to country and while a channel might be formal in one country, it might not be in another (IMF 2009). The funds being transferred are often small and formal banking services are slow, with high transaction costs, making informal and less regulated channels more attractive for the remitters. The use of informal remittance channels makes data collection difficult and has in the past made it hard to gather reliable data on remittances (IMF 2009).

According to the IMF the informal and non-regulated channels are becoming increasingly obsolete with reforms and liberalization of the global financial infrastructure (2009). This has made remittance transmissions easier and less costly, creating incentive for migrants to use formal channels when remitting. The formalization of remittance channels has greatly benefitted the data available on remittances. With more official data on the amounts of remittance being transmitted globally it has become easier to gather aggregates and to conduct statistical analysis on the impact of remittances (Ratha 2003; Vlcek 2006).

2.7 Inequality

From a historical perspective, the fight against inequality has been a driving force in all, major episodes of political violence. From the French Revolution's chant of "liberty, equality, fraternity" to the Russians revolutionaries promise of "peace, land, bread", inequality has been implicitly linked to violent upheavals and challenges to the status quo (Lichbach 1989). Discussions about equality and inequality has also been central within the scholarly traditions ranging from Aristotle to Marx, as they have understood inequality as the *primus motor* behind political violence and conflict³.

Inequality is a broad term and can be separated into three specific types; economic, social, and political inequality (Runciman 1966). Everyone from policymakers and campaigners to academics uses the concept of inequality in a multitude of settings. The close bond between inequality and violent revolt is the focus of many studies, but this paper will focus specifically on the one between economic inequality and political violence.

2.7.1 Measuring inequality

To answer questions related to economic inequality it would first be necessary to find an appropriate measurement of said inequality. There are conceptual issues related to how inequality is measured that are necessary to clarify. It has in recent years become increasingly common to differentiate between two concepts when discussing inequality: *vertical* inequality and *horizontal* inequality. Horizontal inequality measures inequality between groups, defined by identity factors such as ethnicity and religion. According to Østby (2008) inequalities that coincide with group identities (e.g. ethnic cleavages) has the potential to increase grievances amongst the relatively deprived, to a larger degree than vertical inequalities. Inequality between groups creates polarization, which in turn enhances the sense of grievance and group cohesion amongst those that feel relatively deprived, which in turn leads to conflict mobilization (Østby 2008; Murshed & Gates 2005). Studying the relationship between political violence and inequality can produce varying results, depending on whether the focus is individuals or groups and whether these inequalities are of an economic, political or social dimension (Østby 2008; Stewart 2002).

³ Aristotles. 1997. *Politics*. Translation by C.D.C Reeve. Hacket Publishing Company.
Marx, Karl and Fredrick Engels. [1884]2012. *The Communist Manifesto*. London: New Left

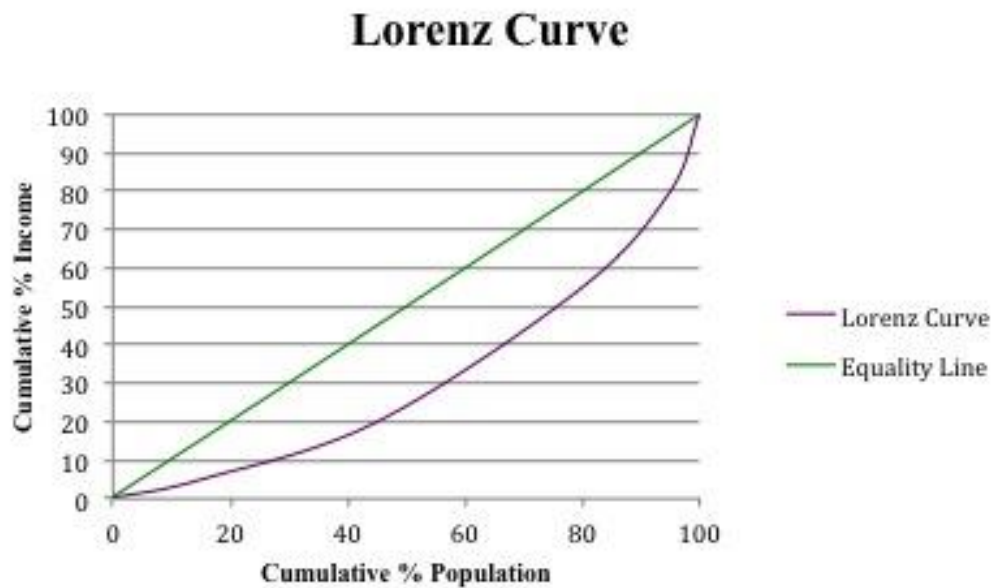
For the purpose of this thesis the statistical models have included the Gini variable (based on the Gini index) as a measure of inequality. The Gini index effectively measures the economic inequality between individuals. Income distribution is a commonly used amongst economists and functions as a *vertical* measurement of inequality. By recording the incomes of everyone in society, from “top” to “bottom”, and thus the Gini index measures the inequality that exists between individuals within a given country (Stewart 2000).

2.7.2 Lorenz curve and the Gini coefficient

Measurements of inequality within economic theory falls into two categories; either through attempts at aggregating and describing inequality *objectively* or through a *normative* understanding of social welfare and ethical notions related to it (Sen [1973]1997). Taking the objective approach requires a statistical measurement of inequality. There exists many different ways of measuring inequality, but one of the most widely used measurements is the Gini coefficient. The coefficient is a measure of statistical dispersion and measures the inequality of a distribution, in this case the distribution of income (Gini 1921).

According to Sen, this is best illustrated in viewing the coefficient in terms of the Lorenz curve (1997[1973]). The curve is used to illustrate the unequal distribution of income/wealth within a population (see Fig.5).

Figure 5. Lorenz curve illustration



Source: Author's illustration

The horizontal axis represents the population (in percentages) from poorest to richest, while the income of the bottom $x\%$ of the population is represented in the y-axis.

If perfect income equality existed, the Lorenz curve would coincide perfectly with the 45-degree equality line. The bottom 5% would have 5% of the income; the 15% would have 15% of the income and so on. This is unrealistic, as the bottom income group will have a proportionally lower share of income (Sen 1997[1973]). Due to the lack of equality, the Lorenz line will be a curve and lie below the equality line. The Lorenz curve will also increasingly get closer to full equality as we get closer to the richest sections of a population. The Gini coefficient represents the ratio of the discrepancy between the two lines (Sen 1997[1973]). The Gini variable included in the statistical models of this thesis is based on the Lorenze curve.

2.8 Previous studies

The possible connection between economic remittances and terrorist events is highly contentious and little research exists on the subject. There are indications of a relationship between remittances inflows and financing of Islamic terrorism (Lyman & Morrison 2004)

and the financing of terrorism in Sub-Saharan Africa (Andres 2008; Deans, Lonnqvist and Sen 2006; Loxley & Sackey, 2008)

In the first global study on the relationship between remittances and terrorism there was found a clear and positive effect between remittances as a share of gross domestic product and terrorist attacks (Mascarenhas & Sandler 2013). The study is unique and provides some insight into the possibility of a relationship between remittances and terrorist events. Employing four dependent variables that cover different types of terrorism, using a variety of data from the *Global Terrorist Database* (GTD) and the ITERATE database. Their study found a significant connection between terrorist events, both domestic and transnational, and remittance inflows. Of their 16 models, remittances have a positive impact on 14 of them, with the strongest impact found between remittances and transnational terrorist events based on perpetrators' nationality (Mascarenhas & Sandler 2013). These findings indicate that remittances are especially a concern for transnational terrorism when it is sent to the terrorists' country of origin.

Identifying economic inequality as a correlate of political violence is common in studies done on the subject⁴. Most major statistical studies on civil war or forms of political violence include economic inequality as a possible variable. According to Lichbach, studies on political violence that do not include economic inequality as a factor should at least mention it as a specification error (1989).

Studies have found that those who identify with a lower economic class report greater feelings of powerlessness and a clear linkage between feeling powerless and increased likelihood of joining in illegal activities and crime (Braithwaite 1979; Messner & Golden 1992).

Previous studies have also found that there are higher levels of crime in communities with high levels of inequality (Chiu & Madden 1998; Bourguignon 2001).

The effect of socio-economic preconditions in influencing terrorist events is difficult to pinpoint. Economic development (or in the case of income inequality, economic *underdevelopment*) interacts with other social phenomenon, making it hard to identify what exactly is influencing the occurrence of terrorist events (Schneider, Brück & Meierrieks 2011).

⁴ Gurr 1970; Koseli 2006; Kayaoglu 2007; Piazza 2006; Nasir, Ali & Rehman 2011

Recent years has seen an increased focus on understanding how interactions between social and economic factors impact political violence. Østby argues for the importance of studying the different dimensions of inequality. A large quantitative study conducted across 36 developing countries across a 18-year period, found significant connection between civil war and horizontal inequalities. Vertical inequality, in the form of economic inequality, was not significant when horizontal social inequality was included (Østby 2008). Findings from Østby (2008) and Stewart (2002) find that horizontal inequalities are a strong explanatory factor when it comes to civil war and political violence.

Results from studies by Gassebner and Luechinger (2011) and Krieger and Meierrieks (2011) indicate little consensus on the role of economic grievances in the exacerbating terrorist events.

Muller and Seligson's cross-sectional time-series study of eighty-five states found that economic inequality is a significant predictor of political violence, when controlling for other factors (1990). The same findings were evident in London and Robinson's analysis of fifty-one developing countries. Socioeconomic factors, such as income inequality were important factors in explaining the presence of political violence (1989). A panel study of 65 countries between 1975 and 1999 also found that higher levels of inequality are significantly linked with higher terrorist activity (Krieger & Meierrieks 2010)

Case studies of revolution and regional analyses of political violence have also found a significant relationship between inequality and the likelihood of some form of political violence⁵. As mentioned previously, there exists a certain degree of consensus on the importance of economic inequality in explaining political violence. Therefore natural to assume that economic inequality will have a significant impact on the occurrence of terrorist events.

2.9 Summary of arguments and hypotheses

This study rests on an assumption that terrorists are "rational" actors, following an internally coherent logic in an attempt at reaching a specific goal. It is assumed that terrorists operate

⁵ Midlarsky, Manus I., 1988. Kileff, Robinson and Leland W. Robinson, 1986. Nejad, 1986. Hamby, 1986.

with an internally consistent set of convictions, values and worldview. While these values and convictions might be deemed immoral and wrong, they are internally consistent with the group's goals and make it possible to analyze potential explanatory factors for their actions. The inclusion of the economic inequality variable is done on the background of the deprivation theory, which claims that grievances rather than opportunity/greed drive terrorist mobilization. Remittances on the other hand represent an opportunity for terrorist mobilization. Through this the two main independent variables represent these two schools of thought.

Earlier studies have focused on remittances as a force for development and its end use in the migrants' local communities. Within the study of migration and remittances there has been a paradigm shift following 9/11 attacks. Regulation and close scrutiny has become commonplace within the global financial sector, in hopes of stopping assets belonging to terrorists and their networks. The "War on Terror" and counter terrorism measures aimed at cutting the terrorist funding has cast a suspicious glow on the global flow of remittances.

There have been few studies done on whether remittances are in fact a force for terror and terrorist funding. There is only one comprehensive global study on the connection between terrorist events and remittances, done by Mascarenhas and Sandler (2013). Their findings point towards a significant link between remittances and terrorist events, especially remittances sent to the home country of the perpetrators. The study done by Mascarenhas and Sandler did not include and control for economic inequality. This is a potential specification error, as remittances might simply be a proxy for inequality. Still, the current discourse on remittances indicate a connection to terrorist prone countries, which leads to the following hypotheses:

H₁: Remittances into a country have a significant impact on the number of transnational terrorists.

H₂: Remittances into a country have a significant impact on the number of domestic terrorist attacks.

H₃: The explanatory power of remittances will be strongest in the transnational models.

Economic inequality, as a divisive force in society, has the potential to create grievances among disenfranchised individuals. The unequal distribution of income/wealth creates a sense of relative deprivation amongst the affected groups, which should theoretically lead to the disenfranchised groups opting for violence to challenge the inequality and the status quo (Krieger & Meierrieks 2010; Collier 2000). Earlier studies done on the relationship between terrorist events and economic inequality indicate a strong significant relationship between the two and stress the importance of including it.

H₄: High economic inequality within a country increases the number of transnational terrorist events stemming from that country.

H₅: High economic inequality increases the number of domestic terrorist attacks.

As mentioned above, by not including economic inequality in their study Mascarenhas and Sandler run the risk of specification error. Based on earlier studies it would be natural to assume that economic inequality is important in explaining terrorist events.

3 Research design and method

Chapter 3 begins with a brief look at the quantitative method and stochastic model theory. As our data material aims to study whole populations, it would also be prudent to look closer at the logic behind continued use of significance tests when we are no longer generalizing from samples. The subsequent sections will look at time series analyses and assumptions related to longitudinal and cross-sectional data, before moving on to the use of negative binomial regression to model count data. The variables included in the statistical models will also be presented, as well as the possibility of an endogeneity bias between the two main independent variables: remittances and economic inequality.

3.1. Stochastic model theory

There exist two main statistical theories on generalizing from data samples: *statistical sample theory* and *stochastic model theory* (Aaberge & Laake 1984). Statistical sample theory aims to generalize from the collected data sample to the population at large (from where the sample was drawn).

As the statistical models developed for this thesis aim to study the entire population (or as close to as possible, rather than a sample, we are operating within stochastic model theory. If we follow the logic of statistical sampling theory the use of significance levels and confidence intervals would be superfluous as we are studying the entire population and should garner perfect predictions (Jakobsen 2007). But as we are operating within stochastic model theory this is not the case. We are generalizing from the observations to the mechanisms that generated observed data. The collected data used in the statistical models is generated from a stochastic experiment, where the findings will differ, even if the conditions are held constant (Jakobsen 2007; Blekesaune 1996).

Using confidence intervals and significance testing is therefore still important when studying the entire population. If no significance is found, the association between the dependent variable and the independent variable is no more probable than an association produced by chance (Jakobsen 2007).

3.2 Negative binomial regression

Typical regression models such as Ordinary Least Squares (OLS) regression is based on certain assumptions that prove difficult to satisfy when using data related to criminology (Maxfield & Babbie 2001). In OLS regressions the dependent variable is assumed to be continuous and its distribution normal (McClendon 1994). Data related to criminal events are often neither. Criminal incidents are usually unevenly distributed as *rare event counts*. That is to say, small values (often zero) are the most commonly observed value across the spatial units (Piza 2012). Most countries are unlikely to experience a terrorist event, which is reflected in the high number of zero-counts. This uneven distribution breaks the assumptions of OLS, necessitating the use of either Poisson or negative binomial regression. Both estimation methods are able to analyze count data that includes a large number of zero-counts (rare events data).

Poisson regression assumes that the conditional mean of our dependent variable is equal to its conditional variance (Long 1997; Hilbe 2007). When the data is over-dispersed this assumption is violated, as the conditional variance of our dependent variable is likely to exceed the mean. This violation can cause underestimated standard errors and can possibly create spurious significance.

The rare events dependent variables in our statistical models suffer from overdispersion amongst the observations. To be able to correctly model our data, it will be necessary to apply Negative binomial regression instead. Negative binomial regression adds a dispersion parameter that models the unobserved heterogeneity that exists amongst our observations (Li & Schaub 2004; Osgood 2000; Paternoster & Brame 1997). The overdispersed data is no longer an issue and the variance is able to exceed the mean without creating possible modeling errors.

The excessive zero counts might also be generated by a separate process and it could therefore be beneficial to model the excess zeros independently, using zero-inflated binomial regression (ZINB). To check for this we run a Vuong test, but we find no evidence to support the ZINB model. Both Piazza (2011) and Mascarenhas and Sandler (2013) have run regressions with terrorist events as dependent variables. Both found that the results from ZINB and standard negative binomial regression obtain similar results for both transnational

and domestic terrorism. This thesis will, based on this and the results from the Vuong test use negative binomial regression rather than ZINB.

3.3 Time Series Cross-Section Analysis

The main characteristic of a time-series is a set of observations x_t , with each observation recorded at a specific time t . Cross-sectional analysis is repeated observations on fixed units. The units are in most cases states or nations. The data used in this thesis is gathered at specific time intervals (year) and on a fixed unit (country), making it a time-series cross-sectional analysis. The observations are gathered sequentially from repeated measurements over a twenty-five-year period (1980-2005).

The dispersion of time series observations varies across time, as they are affected by trends and cyclic tendencies (Yanovitzky & VanLear 2008; Ruspini 2002). These variations make it possible to describe changes across time and spatial units. This in turn makes it possible to look at long-term trends of a phenomenon (Chatfield 1989). Phenomena such as terrorist events are by their very nature “time-bound” processes. As a process terrorist events cannot be studied independently from the past or future, as it is constantly evolving (Yanovitzky & VanLear 2008). Studying terrorist events through a time series cross-section analysis makes it possible to model time and space and in turn generalize from the results.

Time series cross-sectional models can be developed as either lagged or a non-lagged. When running a non-lagged model the dependent and independent variables are observed at the same time. As this makes it impossible to see possible effects on the dependent variable over a period of time, we will include a lag in some of the independent variables and run a lagged time series model, (Ostrom 1978; Yanovitzky & VanLear 2008). By lagging some of the independent variables with one year, the effect of our independent variables on the dependent are given time to manifest and will be beneficial for testing our hypotheses, especially in the case of remittances and the economic control variables.

3.3.1 Assumptions

Correlation

Our independent variables will correlate with themselves over subsequent time intervals and across space, in the form of spatial and autocorrelation (Yanovitzky & VanLear 2008).

Successive observations will be dependent on each other and a variable will therefore correlate with itself over time.

Cross-sectional time series models are often plagued with heteroskedasticity and serial correlation in the error terms. To handle these issues, robust standard errors are estimated and clustered over countries. According to Williams (2000) this should ensure that the standard errors are robust to both heteroskedasticity, as well as serial correlations.

Stationarity

A time series is “stationary” if the mean and variance does not change over time or position (Hamilton 2006). Time series modeling assumes that the series is stationary and theory is derived based on the assumption that the mean and variance of the time series is constant. Non-stationary data can be unpredictable and therefore difficult to model and infer from. Results from non-stationary data run the risk of being spurious and indicating a significant relationship between variables where there is in fact none (Nason 2006). To mitigate the potential spurious effect year dummies have been included in alternative models that will be presented after the main findings in chapter 4. The inclusion of the lagged dependent variable should also efficiently even out any temporal dependence that exists within the data.

3.4 Variables

In a regression analysis there are two types of variables: the endogenous (Y) variable and the exogenous (X) variables, also known as the dependent and the independent variable. We will first look at the endogenous variable used in our models, before moving on to look at the exogenous variables that are included to explain changes in endogenous. There are two main exogenous variables, while the rest are utilized as controls based on previous research and literature related to terrorism and political violence. The analysis covers 185 countries over a twenty-five year period, 1980-2005.

3.4.1 Dependent Variables

The two dependent variables included in our models are, as mentioned previously, terrorist event counts. The transnational dependent variable is constructed by Mascarenhas and Sandler (2013) and based on data compiled from the ITERATE database (Mickolus et al 2012). The aim of the ITERATE database is to quantify transnational terrorist groups and their attacks in a large- n database. The database consists of numerical data gathered from international press and news agencies, used to create chronological observations and accounts of all transnational terrorist events around the globe. The variable is coded to study the perpetrators country of origin, rather than the venue of the attack. This enables us to test the effect of remittance inflows into the perpetrators country of origin. Intuitively, the remittances sent to the perpetrators country of origin is of greater interest than remittances sent to the “host” country of the attack. To ensure this is studied correctly the dependent variable should therefore identify the perpetrators nationality, rather than focus on the country where the attack takes place.

The domestic dependent variable is constructed by Piazza (2011) and based on event data from the *Global Terrorism Database* (GTD). Terrorism datasets differ from other social science datasets, as they are constantly evolving as new attacks take place. The validity of the data is therefore of critical importance, which is why the quality of the news sources is paramount. GTD uses different media sources, such as news articles, electronic news archives and other publicly available sources. Like the ITERATE database, GTD gathers information on each terrorist incident, with numerous variables for each attack (GTD 2013). The first seven models use the transnational counts (see Table 3.) as the dependent variable, before the domestic count variable is included as the dependent variable in the last seven models (see Table 4.).

3.4.2 Remittances

To measure the effects of remittances we have included a variable with data from the World Bank. As earlier mentioned, the ability to compile data on remittances varies greatly across countries. In most countries reporting on remittance transfers is required, with banks and financial institutions reporting to financial authorities or central banks. The rules on reporting are not homogenous, which has a significant impact on the compilation of remittance statistics. Remittance as a financial activity is often reported as part of larger statistical

information on general financial activities, including cross-border transactions, foreign exchange controls etc. As financial transactions (including remittances) are routed through a banking system there will exist some form of paper trail for most transactions.

Remittance transfers are included in the balance of payments statistics, but no single entity in the balance of payment framework captures the exact transactions in remittances (IMF 2009). This complicates the aggregation of remittance data, and requires the use of different data points to discern remittance flows. To compile remittance data, two main sources are used: 1) Non-resident workers income; and 2) transfers from residents of a given economy to residents of another (Yang 2011). The main independent variable is based on workers' remittances and compensation of workers in current US dollars (World Bank 2014). The remittances are measured as a ratio to the GDP, making it possible to see the relative size of remittances as a part of the receiving country economy.

3.4.3 Economic inequality

There are different approaches to determine levels of economic inequality. As mentioned in chapter 2, the Gini index is the most common measure of income inequality and measures the degree of inequality in income distribution. The Gini index applied in this thesis is based on data from *the Standardized World Income Inequality Database (SWIID)* (Solt 2009). The existing Gini data gathered by the World Bank lacks coverage and most Sub-Saharan countries are not included in the data. This makes the data difficult to apply to a regression analysis, as it is not possible to significantly compare across observations. To counter this problem the SWIID database uses different sources to gather and standardize as much data on income and income inequality from different sources⁶, but at the same time avoiding potentially problematic assumptions by applying (when possible) information from proximate years in the same country. Intuitively, income inequality is a slow changing structure; therefore applying data from previous years (when in concordance with other data sources)

⁶ SWIID consists of data from the following sources: The United Nations University's *World Income Inequality Database*, the *OECD Income Distribution Database*, the *Socio-Economic Database for Latin America and the Caribbean* by CEDLAS and the World Bank, *Eurostat*, the World Bank's *PovcalNet*, the *UN Economic Commission for Latin America and the Caribbean*, the *World Top Incomes Database* and different national statistical offices around the globe (Solt 2009).

should prove less problematic. The data found in the Luxembourg Income Study is used as the standard (Solt 2009).

A Gini coefficient of zero indicates perfect equality, a country where all incomes are the same. A Gini coefficient of hundred indicates maximum inequality. The Gini index oversimplifies, as the absolute and relative levels of inequality are hard to measure. There are also demographic issues with the index, as countries with a young population enrolled in higher education would seem to have lower levels of income equality, even if these persons would later go on to well-paid jobs after getting degrees. It is still possible to ascertain general trends and is useful for the purpose of this thesis.

3.4.4 Endogeneity bias

Intuitively, countries with high levels of economic inequality might see an exodus of migrants seeking better economic opportunities abroad. This inequality induced exodus would in turn lead to transmissions of remittances, making the two main independent variables determined by each other, so-called *simultaneity* (Brockwell & Davis 1991).

Remittances and economic inequality will therefore not only have a relationship with the dependent variable, but it is also likely there exists a relationship between the two.

If an endogenous relationship exists between migrant remittances and economic inequality, the benchmark model results would be sensitive to it. It is therefore important to determine if the causal inferences are a result of such an endogeneity bias. Fixed-effects models are common to use in testing for possible endogeneity bias (Li & Schaub 2004). This is done through two-step estimation. The method used for correcting the possible endogeneity issue is also likely to reduce the efficiency of the estimators, and is therefore not included in the benchmark model but rather tested separately in models 6 (see Table 3. and 4.). Running an endogenized version of the remittance variable (based on residuals from the fixed-effects model) should reveal whether the findings in model 1 are affected by any endogeneity. Testing for the presence of endogeneity bias will be presented in-depth in chapter 4.

Table 1: Descriptive, continuous variables

Variables	N	Min	Max	Mean	Std.Dev
Remittances	3,747	0	106.47	3.513	7.660
Gini	3,711	14.559	80.785	38.155	10.838
Trade	4,859	0.309	562.060	81.687	50.719
FDI	4,613	-82.89	145.202	3.184	6.502
$\ln\Delta(\text{GDP per capita})$	4,094	3.913	11.315	7.883	1.601
GDP per capita ²	4,094	15.311	128.003	64.711	25.730
Ethnic fractionalization	4,992	0	0.930	0.451	0.262
Religious fractionalization	5,022	0.002	0.860	0.433	0.239
$\ln\Delta(\text{population})$	5,557	10.493	21.014	15.587	1.880

Table 2. Descriptive, dummy coding of COW variable

Variables	Frequencies	Percent
Sub-Saharan Africa	1395	25.01
America	1022	18.32
Asia	1085	19.45
Europe	1394	24.99
MENA (Middle East & North Africa)*	682	12.23
Total	5578	100

*Middle East held as reference category

3.4.5 Economic inflows

The transmission of remittances is one of the largest global financial transmissions, but there are also other economic inflows that are important to control for. All economic variables included in the models are from the World Bank (2014).

Trade is the annual sum of imports and exports in goods and service within a country as a share of the gross domestic product. Measures the openness of a country's economy to trade flows. Terrorist groups have been known to trade contraband on the international markets to fund their operations and as globalization increases these transactions have become increasingly less dangerous and less likely to be stopped (Matthew & Shambaugh 1998).

Foreign direct investments represent the net inflows of foreign investments into the economy, as a ratio of the country's GDP. The FDI stock of a country also indicates the degree of openness of the country to foreign capital and economic mobility. The volume of foreign

direct investments has increased dramatically over the last two decades, from \$180 billion in the late 1980s and to \$1.85 trillion in 2008 (Oatley 2012[2006]). As FDI flows into a country's economy increases, the assumption is that prosperity increases as well. This in turn decreases the peoples grievances and reduces the likelihood of groups attempting to shake the status quo through violence (Mascarenhas & Sandler 2013). Poor economic development and a lack of integration into the globalized economy can induce perfect conditions for terrorists seeking to recruit (Johnston 2001).

Gross domestic product (GDP): The causal relationship between economic development and terrorist events is a complex one. The idea that economic development influences the occurrence of terrorism has been greatly studied but there results are unclear on the causal relationship between the two. According to Collier, slow economic growth is important in explaining the occurrence of rebellion or violence (2006). It is important to note that Collier focuses on civil war, not terrorism, as a manifestation of political violence. Terrorism may occur during civil war, but it need not. Other studies indicate that there is no empirical evidence to support the "rooted-in-poverty" thesis and a direct connection between poverty and terrorism (Piazza 2006; Krueger & Malecková 2003; Taylor 1988).

While poverty on an individual level might not be associated with terrorism, there is still the possibility that it might matter on a national level. As Krueger and Malecková point out, the relationship between transnational terrorism and economic development should therefore also be assessed using a cross-country analysis (2003). An impoverished country with low GDP might still see a minority take to violence as a way of improving their conditions. This is also found in Collier's study (2006), where the risk of political conflict is higher in countries with low incomes. There is a distinct possibility of poverty influencing the occurrence of terrorism. A metastudy done by Gassebner and Luechingers, based on 43 different studies, using a variety of combinations of 65 variables in 13.4 million different regressions, found nothing to indicate a causal relationship between terrorism and per capita GDP (2011). As suggested by Enders and Hoover's (2012) study on the non-linear relationship between terrorism and GDP per capita, there is a clear degree of curvilinearity in the causal relationship between the two.

To test for the possibility of such a causal relationship existing (or not existing) a GDP per capita variable has been included. The variable should be able to test for possible links between poverty/low economic efficiency and terrorism. All the economic indicators have

been lagged one year behind the dependent variables, giving the economic factors time to manifest within a country.

3.4.6 Regime type

The effect of regime type on the occurrence of political violence has been covered extensively by previous research (Wade 2007; Wilson & Piazza 2013). The two main schools of thought, political access and resource mobilization, have competing views on how regime influences the occurrence of terrorist events, but both contend that regime characteristics have an impact on terrorism.

The political access school views democracy as a tool for ensuring representation and (more importantly) a feeling of efficacy for the people. Democracies are viewed as a mechanism that institutionalizes political action in orderly forms and through this makes terrorism unnecessary. The institutionalized channels gives people the possibility to influence policy concerns through peaceful means rather than through political violence (Eyerman 1998). This view has been criticized for conflating democracy with political access, as democracy is not a sufficient to ensure political access and feelings of efficacy in groups (Brooks 2009).

The competing perspective, the resource mobilization view, contends that open societies such as democracies are more prone to political violence. Li (2005) claims that political access, instead of ensuring less terrorist activity, actually creates more. Democratic regimes are characterized by freedom of speech and free press, which can give terrorists the platform they seek for broadcasting their message. Proponents of this view claim that democracies are especially vulnerable to political violence because people are more likely to express open dissent, both non-violent and violent (Hegre, Ellingsen, Gates & Gleditsch 2001). Autocratic regimes are able to suppress dissent and disagreements, and thus avoid the issue of political violence, even in the face of grievances amongst the populace (Muller & Weede 1990). While autocratic regimes can use any means necessary to hinder violent attacks, democracies are bound by certain standards that make it hard to stop political violence. Previous studies also lend support to this school of thought (Piazza 2007; Eubank & Weinberg 2001; Eubank & Weinberg 1998).

The regime variable is from the Polity IV dataset (Marshall, Gurr & Jaggers 2013). The combined polity score (*Polity2*) has been modified to ensure standardization of all years so that they can be combined and used in a time-series analysis. The variable is a unified polity

scale ranging from +10 (strongly democratic) to -10 (strongly autocratic). There are also indications of a non-linear relationship between political violence and regime type (Abadie 2004). In effect, terrorists are more likely to mobilize in countries that are undergoing a democratic transition, so-called anocracies (Hegre et al. 2001; Ellingsen & Gleditsch 1997). Autocratic regimes moving towards democracy will see an uptick in violence before the increase in political freedom leads to a sharp decrease in political violence. Regimes that score in the middle ranges on the democracy-autocracy index, anocratic regimes, are more prone to political violence (Russett & O'Neal 2001; Hegre et al. 2001). The transformation from an autocratic to a democratic regime could possibly lead to long-simmering tensions rising to the surface, as an explanation for the curvilinear effect. To control for the possibility of such a relationship existing a squared term of the regime measure has also been included. There are few studies done on whether this curvilinear relationship also exists when looking at the terrorists' country of origin. The transnational attacks are coded to look at the country of origin, rather than country where the attack takes place, which means the same U-shaped relationship, might not exist. A curvilinear relationship is more likely to manifest when looking at domestic terrorism.

3.4.7 Ethno-religious fractionalization

Group identity and identification is an important aspect of mobilization. Previous studies have shown that a common identity is necessary for a group to form (Gurr 1994; Tilly 1978; Ellingsen 2000). By creating an in-group, there is at the same time an automatic exclusion of those not belonging to the group.

Ethnicity and religious identification are seen as two of the most important identities and is what Ellingsen calls a fundamental factor (2000). These fundamental factors are particularly conflict prone as they are often viewed as more important than for example traditional national borders. Previous studies have found that ethnic fractionalization increases the risk of terrorism, in the case of domestic terrorism (Foster, Braithwaite & Sobek 2013).

Religious fractionalization has also been controlled for, as it has many of the same functions as ethnicity in creating and reaffirming group unity (Juergensmeyer 1996).

Religious views are also a central component of individual and group identity, shaping its followers worldview. Religious and fractionalization is often included in terrorism studies⁷ to control for this identity effect. Fractionalized states, in which competing worldviews and identities are prevalent, experience more terrorist attacks than ethnically homogenous societies (Skjoldberg & Nordås 2007; Malecková 2005). On the other hand, studies have also found that religiously fractionalized societies have *lower* levels of attacks than homogenous societies (Bandyopadhyay & Younas 2009).

To control for ethnic and religious fractionalization the model has variables on ethnic and religious fractionalization. The fractionalization variables included in the thesis dataset is from Alesina et al (2003). The variable is based on the ethnolinguistic fractionalization (ELF) index⁸. The index gives the likelihood of two randomly chosen individuals within a country belonging to the same ethnic group, based on values between 0 and 1.

The ELF index measures ethnic diversity using a minus 1 decrease of the Herfindahl concentration index (Bossert, D'Ambrosio & Ferrara 2005). If we have a society composed of $K \geq 2$ different ethnic groups, the p_k represents the share of group k in the entire population, giving the ELF index value by:

$$1 - \sum_{k=1}^K p_k^2 \quad (1)$$

The ethnic fractionalization variable ranges between 0 and 1. Higher numbers indicate a higher probability that two randomly chosen persons from the same country belong to different ethnic groups. In effect, countries with higher disaggregation of ethnic groups will be closer to 1, while countries with larger ethnic groups will be closer to 0. The religious fractionalization variable is coded the same, the closer to 1, the more likely that the two chosen individuals from the same country are members of different religious groupings. There

⁷ Abadie 2004; Krueger & Laitin 2008; Collier & Hoeffler 2004; Basuchoudary & Shugart 2010; Krieger & Meierrieks 2011; Blomberg & Hess 2008

⁸ The ELF index is based on the concentration index developed by Herfindahl and Hirschman. The index functions as a measure of concentration and was originally an index to measure the number of firms within a market. When calculating the ELF index it is the relative size of ethnic groups rather than firms (Kelly 1981).

are also other possible ways of measuring group belonging within a society that also takes into account feelings of marginalization and polarization⁹

3.4.8 Other control variables

Population size

A variable that measures the size of the *population* has been included (World Bank 2014). Larger countries are often highly heterogeneous, which can lead to feelings of alienation amongst subgroups that in turn resort to violence (Li & Schaub 2004). Countries with sizable populations are also more likely to have terrorist events as a result of the difficulties in policing a larger population (Chenoweth 2010; Eyerman 1998). The variable has been lagged one year and logged.

Past terrorist activity (lagged dependent variable)

Terrorist groups have a tendency to continue their operations within a given country rather than move, as a result of cost considerations (Li & Schaub 2004). It is therefore natural to assume that countries that produce terrorists will continue to do so. The activity of one group might encourage activity from others in the form of inspiration and copycats. Midlarsky, Crenshaw and Yoshida call this “the contagion process” (1980). The activity of one group might inspire future activities of other persons or groups within the same state, creating a contagion of terrorist mobilization within a country. The first terrorist event can therefore be seen as the heralding of a radicalization process within a single country. Likewise, countries that do not have any terrorist activity may continue to experience the absence of terrorist activity over time.

⁹ Esteban and Ray (1994) define polarization as the sum total of interpersonal “antagonisms”. These antagonisms are a results of two factors; 1) the sense of group identification (group size) and; 2) feelings of alienation from other groups (intergroup distance). By measuring the levels of polarization, it becomes possible to discern the conflict potential of existing structural differences between groupings (Østby 2008). The \mathbf{b} is the intergroup distance and σ captures the level of group identification and functions as a (positive) parameter:

$$P(\sigma, \mathbf{b}) = \sum_i \sum_{j \neq i} n_i^{1+\sigma} n_j b_{ji}$$

Including a lagged term of the dependent variable is also helpful in controlling for possible effects of relevant but omitted structural variables, as well as dealing with any serial correlation in the error term. The use of a lagged dependent variable as a modeling strategy is becoming increasingly accepted within political science studies (Beck & Katz 1995; Burkhart & Lewis-Beck 1994; Li & Schaub 2004). Wilkins article on the lagging of dependent variables also suggests that a theoretically funded inclusion of the dependent variable gives the best estimates of the effect of the independent variable (2013).

Ongoing conflict

The truism “conflict breeds more conflict” has many historical examples, from the Russian Revolution following on the heels of World War I, as well as more modern examples such as the war in Iraq. What began as a US-led invasion is today a civil war fought between different factions. Ongoing conflicts are a good indicator of potential violence and have therefore been included (Lutz & Lutz 2004). The data on ongoing conflicts is from the Uppsala Armed Conflict Dataset (Gleditsch et al. 2002). The variable has been dummy coded, identifying whether conflict was present (1) or not present (0) and then lagged one year.

Regional dummies

Previous studies have found regional differences when it comes to degree of vulnerability to terrorists, as certain areas are more prone to see the emergence of terrorists and this is unevenly distributed spatially (Li & Schaub 2004; Global Terrorism Index 2012). To control for these systematic differences across regions, regional dummy variables have been constructed: Sub-Saharan Africa (referred to as Africa), Asia, Europe, America and Middle East & North Africa (MENA). MENA is used as a reference category and has been excluded from the models.

3.5 Outliers

It is difficult to discern outliers using Negative binomial regression, as traditional procedures such as Cook’s distance and similar outlier detectors are not useful and is likely to produce (Hilbe 2007). Hilbe suggest using standardized Pearson’s residual when studying outliers in count model data (2007). The Pearson residuals provide a good measure of fit and indicate how good the observations are predicted by the model. By plotting the standardized residuals against the main explanatory variables we should be able to detect potential outliers (see

Appendix A.8-11). Studying the outliers' reveal that certain countries (Nigeria, Ireland, Panama) are overrepresented as outliers. Their removal does not significantly change the results of the benchmark model. Re-running the benchmark model after filtering out any Pearson residuals with a value above 2 only weakens the model, without significantly impacting the results. There are therefore few indications that the outliers exert any high degree of influence. The outliers are left in the models.

Table 3. Negative binomial regression. Transnational terrorist events, remittances and economic inequality. 1980-2005.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Remittances	0.034**	0.030***	0.023**	0.034**	0.031**	0.037**	0.185***
GINI	0.026**		0.020*	0.024**	0.021**	0.026**	0.033**
Trade	-0.011**	-0.009**		-0.013**	-0.011**	-0.011**	-0.011**
FDI	-0.081**	-0.055***	-0.103***		-0.082**	-0.081**	-0.083**
lnΔ(GDP per capita)	0.166**	0.073	0.155*	0.186**		0.166**	0.192
Ethnic fractionalization	-0.193	-0.113	-0.294	-0.128	-0.232	-0.193	-0.138
Religious fractionalization	-3.039**	-2.203**	-2.998**	-3.112**	-2.373*	-3.039**	-3.392**
Religious fractionalization ²	2.897**	1.751	2.711**	2.817**	2.343*	2.897**	3.481**
lnΔ(SIZE)	0.124*	0.173**	0.261***	0.118*	0.127*	0.124*	0.128*
Ongoing conflict	0.730***	0.842***	0.777***	0.734***	0.713***	0.730***	0.752***
Previous event	0.027***	0.027***	0.276***	0.028***	0.027***	0.027***	0.027***
Regime	-0.011	-0.003	-0.012	-0.132	0.002	-0.011	-0.014
Africa	-1.537**	-0.928**	-1.301**	-1.462**	-1.792***	-1.537**	-1.523**
America	-0.618*	-0.183	-0.369	-0.698**	-0.658*	-0.618*	-0.597*
Asia	-0.853**	-0.692**	-0.888**	-0.829**	-1.070***	-0.853**	-0.811**
Europe	-0.566*	-0.476	-0.618*	-0.608*	-0.478	-0.566*	-0.585*
Non-OECD							-0.595
Non-OECD x remittances							-0.152**
Non-OECD x GINI							-0.012
Constant	-3.639**	-2.871*	-6.190***	-3.560**	-2.040	-3.643**	-3.987**
Observations	2001	2426	2003	2041	2022	2001	2001
Wald test (X ₂)	445.79***	541.77***	427.40***	479.08***	395.06***	445.79***	499.42**

Note: OECD = Organization for Economic Cooperation and Development *** $p < 0.01$ ** $p < 0.05$ * $p < 0.1$

4 Results

Chapter 4 discusses the results of the empirical models. The focus will first be on the result of the benchmark model (model 1), before testing the robustness of the findings in models 2-7. The exclusion of explanatory variables increases the understanding of how they correlate with each other and impact the results in the benchmark model. The chapter first presents the findings from the transnational models (Table 3.), before moving on to the domestic models (Table 4.) and a final summary of the main findings.

4.1 Transnational terrorism

We will begin by studying the results from the benchmark model (model 1, Table 3.). Models 2 through 7 test the robustness of the benchmark results. Model 2 will first exclude economic inequality to control for its effects on the results. Li and Schaub (2010) suggest that a collinear relationship might exist between trade, FDI and economic development (in the form of GDP per capita). The economic variables are therefore sequentially excluded from models 3-5 to control for this. Model 6 controls for the possibility of an endogeneity bias. As mentioned previously, there is a possibility of the remittance variable being endogenous to the economic inequality variable, as remittance inflows might themselves be the result of pre-existing economic inequality.

Model 7 controls for the possibility that the effect of remittances differs between developed countries and less-developed countries. To determine this two additional variables have been included in model 7: a dummy variable for non-OECD countries, where non-OECD countries have been coded 1 and OECD countries are 0; and an interaction term between the non-OECD variable and remittances. The interaction term has been included to discern any differences between countries with different economic policies and ideological views. Two of the main criteria for OECD membership are a focus on democratic principles and promotion of market economics (Noboru 2004).

4.1.1 Benchmark model

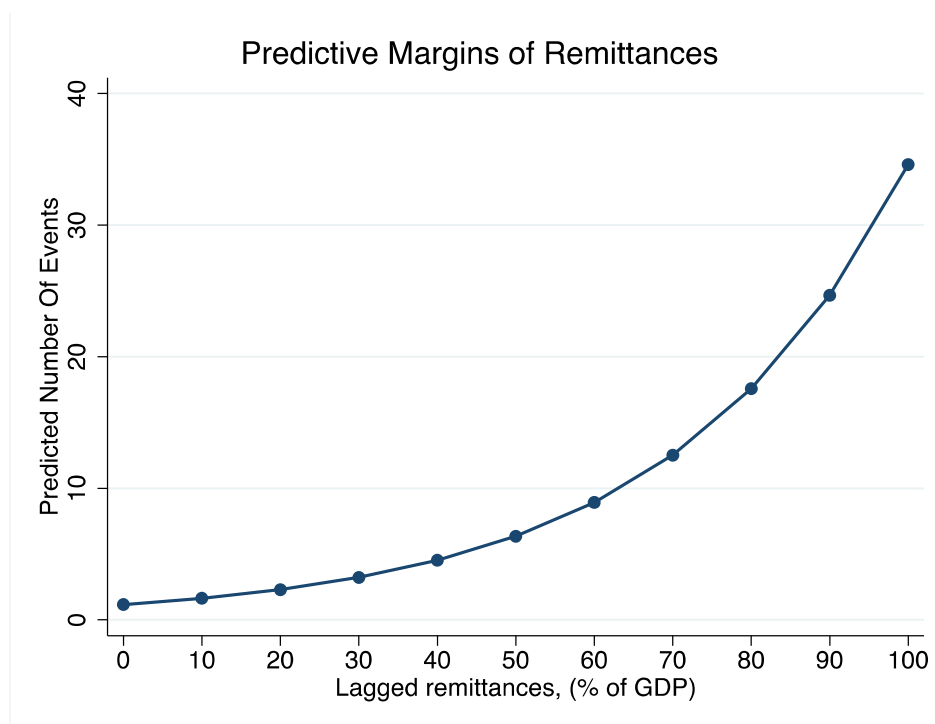
In model 1 the dispersion parameter delta is 6.54, indicating overdispersion. As the conditional variance of the transnational terrorist count variable exceeds its conditional mean, the choice to use Negative binomial regression instead of Poisson regression is justified.

The Wald chi square test is also statistically significant at a 1% level, indicating a good model fit for the benchmark model.

Remittances and economic inequality

The key independent variable in our model, lagged remittances (REMITTANCES), is significant at the 1% level. This indicates that the remittance variable, as a percentage of the GDP, is positively related to the mobilization of transnational terrorist groups or individuals. A 1% increase in the remittance transmissions into a country increases the expected number of terrorist attacks with 3.4%. This supports H_1 .

Figure 6. Margins plot: remittances



The economic inequality variable (GINI) is significant at the 5% level and also positively associated with higher expected numbers of transnational terrorists stemming from a country. With every 1 point increase on the Gini index, the expected number of transnational terrorist originating from the country grows by 2,6%. This suggests a significant relationship between the economic inequality and transnational terrorism mobilization, lending support to H_4 .

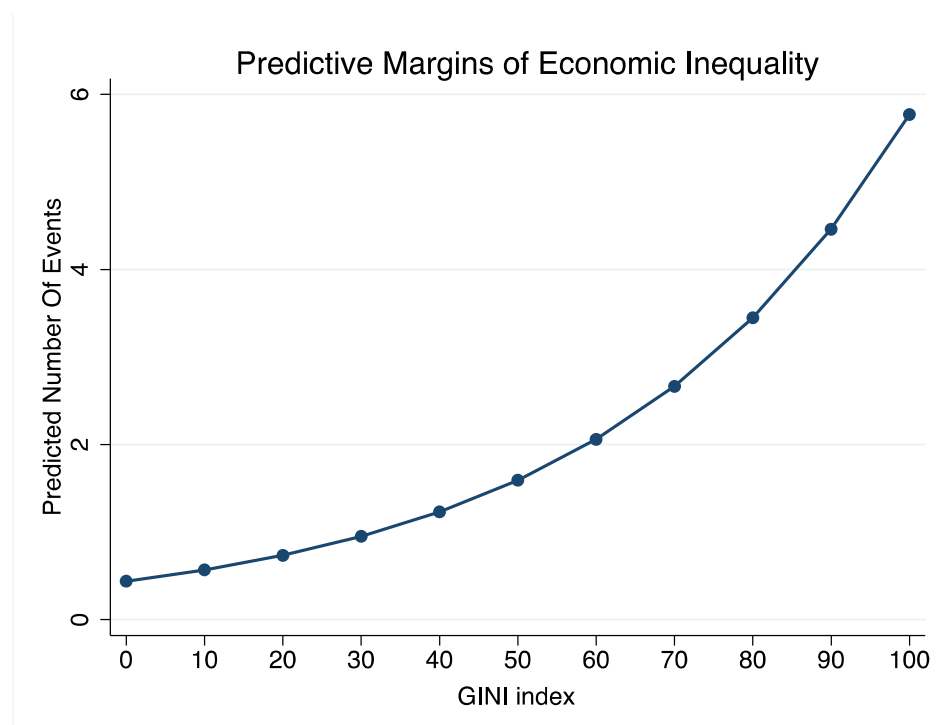
Other economic variables

Model 1 also includes other economic variables, used to control for the impact of the two main explanatory variables of remittances and economic inequality.

Foreign direct investment (FDI) and trade (TRADE) both have significant negative relationship with the dependent variable, at the 1% and 5% level respectively. A strong trade and FDI flow into a country significantly lowers the risk of terrorists mobilizing from that country. A 1% increase in a country's trade (export and import) decreases the expected number of terrorist attacks from that country with 2.3%.

A 1% increase in FDIs into a country decreases the expected number of transnational terrorist attacks coming out of that country with 4.6%. The percentages are small, but the possibility of closer economic ties (through economic globalization and investments) clearly has an impact on the existence of terrorist attacks and increased economic ties with terrorist prone countries could therefore be expected to decrease terrorist mobilization. An example of this is if trade, as a percentage of GDP, grows with 10%. If a country's trade sector increased with 10% the expected number of transnational terrorist events originating from that country would decrease with 11%¹⁰.

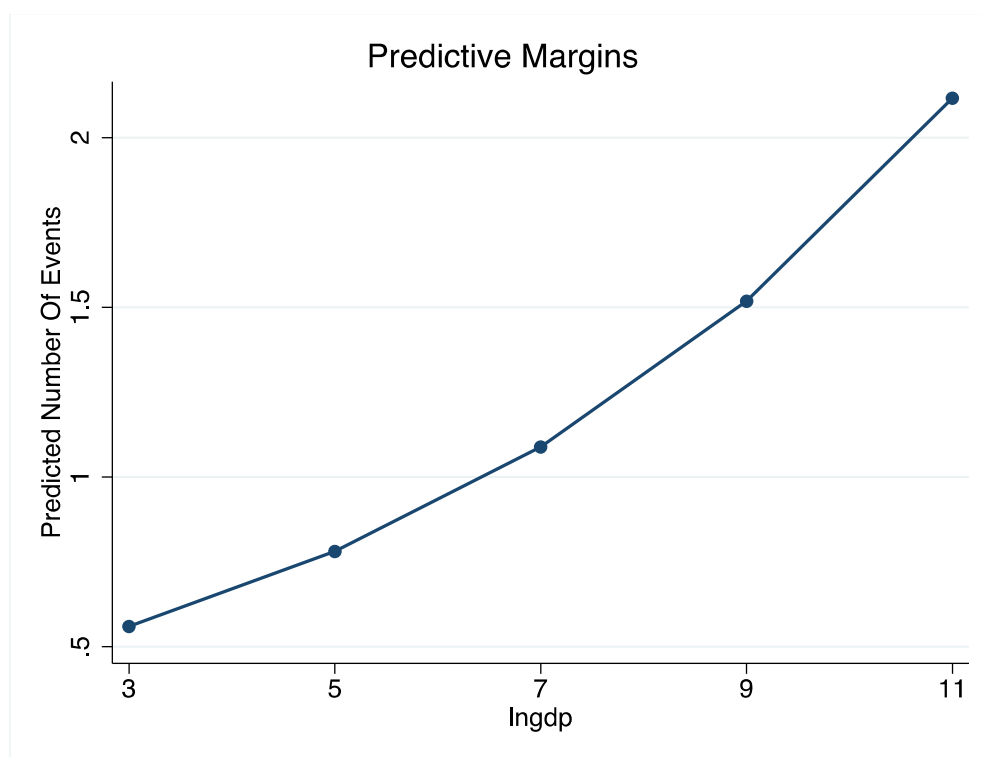
Figure 7. Margins plot: economic inequality



¹⁰ Trade IRR = $0.9886512^{10} = 0.8912$
 $1 - 0.89 = 0.11 = 11\%$

The GDP per capita variable (GDP) is significant in the benchmark model. The results indicate that countries with a higher GDP per capita are associated with higher expected numbers of transnational terrorist mobilizing within that country. Previous studies on the causal relationship between economic development and terrorism have proved inconclusive, with some studies finding some evidence for the “rooted in poverty” hypothesis, while other studies have not found any indications of a relationship. The results indicate that wealthy, well-developed countries are at greater risk of creating potential transnational terrorist, more so than countries “rooted in poverty”. There is some evidence in previous research of similar findings (Krueger & Laitin 2007). The possibility of a curvilinear relationship was also tested but not found significant.

Figure 8. Margins plot: GDP per capita



Control variables

The ethnic fractionalization variable (ETHNIC) is not significant in the benchmark model. To control the lack of significance a squared term was included for the ethnic fractionalization variable, but as it was not significant it has not been included in the final model.

Religious fractionalization (RELIGIOUS) and its squared term are on the other hand significant, indicating that there is a curvilinear relationship between the dependent variable and religious fractionalization.

The variable is a significant determinant of terrorism in model 1 and significant at the 1% level. Any preexisting conflict is related to the existence of terrorists or terrorist groups. The results find that preexisting conflicts within a territory increases the expected number of transnational terrorist attacks from that country with 108%. Countries that are already rife with unrest are more likely to produce terrorists or terrorist groups. These results are in concordance with previous research that has found pre-existing conflict to be good indicators of terrorist presence.

The variable for previous terrorist activity (PREVIOUS EVENT) is significant at the 1% level. This lends credence to Midlarsky, Crenshaw and Yoshida's "contagion process" (1980), where a country with a terrorist presence will have a higher expected number of terrorists in the future. The significant relationship between the dependent variable and previous terrorist activity is such that it is meaningful to talk of "terrorist prone" countries. Terrorist attacks are rare but countries where previous attacks have come from are risk countries and are more likely to produce terrorists in the future. The expected number of transnational terrorists stemming from a country rises with 2.7% for every previous attack.

The REGIME variable is not significant, indicating that regime type does not influence the existence of terrorist or terrorist groups within a country. Intuitively, more democratic regimes are less likely to produce grievances that could potentially turn violent. Democratic regimes that are able to respond to grievances and improve have been found to experience fewer terrorist events (Li 2005). To control for the possibility of the inverted U-shaped, curvilinear relationship, mentioned by Abadie (2004), a squared term was tested but not found significant. This is not consistent with previous research. While the studies differ on whether democracies have a negative or positive impact on the occurrence of terrorist attacks, the association has been found to be significant (Li & Schaub 2004; Eubank & Weinberg 1994). The lack of a significant association between regime type and the dependent variable might be explained by the fact that the regression is studying terrorists' countries of origin rather than the venue country. A country's regime is therefore not significant in explaining the mobilization of transnational terrorists or terrorist groupings. The regime type might be important when looking at the venue of attack but not necessarily when studying the countries where the terrorists mobilize.

The logged variable for the total population (SIZE) of a country is positive and significantly associated with transnational terrorism. A 1% increase in the size of a population increases the expected number of terrorist events stemming from that country by 13%. Countries with large populations are more likely to produce terrorists or terrorist groups that commit transnational terrorism. This is consistent with previous literature that found the same relationship between large populations and an increased risk of terrorist events (Eyerman 1998; Chenoweth 2010; Li & Schaub 2004).

The regional variables should control for possible regional variations in the spread of transnational terrorist mobilization. The results indicate that the geographical distribution of transnational terrorists is highly significant. There are significantly fewer terrorists mobilizing from all other continents, relative to the MENA region. Africa experiences 79% fewer transnational terrorists mobilizing from the region; Europe 43%; America 46%; and Asia 57%. These results indicate that the MENA region is more prone to produce transnational terrorists, than other regions.

4.1.2 Model variations and robustness checks

The economic inequality variable (GINI) is excluded from MODEL 2, without greatly affecting the other main independent variable, remittances (as a percentage of GDP). Remittances inflows are still significant, as well as the economic variables trade and FDI. The only economic factor influenced by the exclusion of economic inequality from the model is the logged GDP per capita variable. In the benchmark model GDP per capita was a significant explanatory variable, but this is not the case in MODEL 2. There are clear indications that the GDP per capita is correlated to economic inequality, as the explanatory power of economic development is weakened considerably and is no longer significant.

The control variables remain largely unchanged, with the exception of religious fractionalization, which is no longer significant. There are also significant changes in the regional dummies when economic inequality is excluded. Neither Europe, nor America is significant, while Asian and African countries still mobilize significantly less transnational terrorists than the MENA region.

MODEL 3 excludes one of the economic control variables, trade. The exclusion of trade has not significantly impacted any of the inference made in the benchmark model about the two

main independent variables, remittances and economic inequality. The lagged remittance variable and the Gini coefficient are both still positive and statistically significant.

The other economic variables, FDI and GDP per capita, are both still significant. Increased foreign direct investments into a country's economy are negatively associated with transnational terrorist mobilization. Increased economic development, in the form of increased GDP per capita, still has a positive impact on the expected number of transnational terrorist attacks stemming from a country.

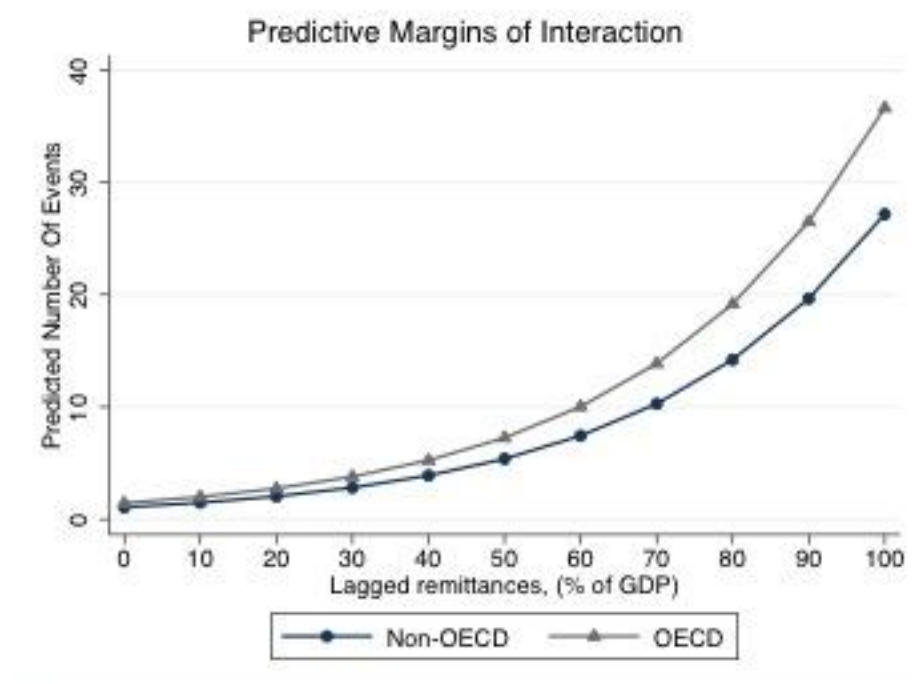
The control variables remain unchanged in MODEL 3, with the exception of one regional variable. There is no longer any significant difference between MENA and the Americas when it comes to mobilizing transnational terrorists. The lack of significance for the Americas variable suggests that when trade relations are not considered the explanatory power of the variable is significantly weakened.

MODEL 4 removes FDI from the model. Remittances are still positive and significantly associated with expected increases in transnational terrorists within a country. None of the other economic variables differ significantly from the results in the benchmark model. Economic inequality is still significant and higher levels of inequality are positively linked to higher expected of transnational terrorists stemming from a country. The significance levels of the other control variables remain unchanged from model 1 and with only minor changes to their coefficients, with the exception being the regional dummy variable for Europe, which is not significant when the FDI variable is excluded.

The final economic variable, the logged GDP per capita, is excluded from MODEL 5. The exclusion does not have a significant impact on the two main independent variables, with both remittances and economic inequality remaining positive and significant, both at the 5% level. MODEL 6 aims to control for the possibility of an endogeneity bias. The first step requires running a two-way, fixed-effects model with the remittance variable being regressed on Gini, trade, FDI, the lagged dependent variable and dummies for country and year. The robust standard errors are estimated. The results of the fixed-effects model are included in the appendix (A.5).

After running the fixed-effect model, the predicted value of the remittance variable is calculated and substituted into the benchmark model (model 1). Running the negative binomial regression again finds that the significance does not differ from the original benchmark model. The main independent variables still have a positive impact on terrorist mobilization and remain statistically significant. The results, found in model 6 indicate that the inference made in the benchmark model is not influenced by any endogeneity bias. The coefficients in model 6 differ only slightly from the benchmark and the main independent variables, remittances and economic inequality, remain significant. There are therefore no indications that the results obtained in the benchmark were influenced by an endogenous relationship between the two main independent variables.

Figure 9. Interaction plot: OECD and remittances



The two interaction terms are included in MODEL 7, in addition to the non-OECD dummy. As the remittance variable is the main effect variable they can only indicate the effect of remittances on non-OECD countries, while the interaction term measures how remittances differ going into non-OECD countries compared to OECD countries.

The interaction term between non-OECD countries and remittances is negative and statistically significant. These results indicate that non-OECD countries that receive remittances have a lower expected rate of transnational terrorist than OECD countries that

receive remittances. The interaction plot (Fig.9) highlights how the impact of remittances differs between OECD and non-OECD countries. Initially both OECD and non-OECD countries are close to equal, but as the percentage of remittances into the country increase, the predicted number of transnational events from that country increases more drastically in OECD countries. Remittances also impact non-OECD countries but to a slighter degree than OECD countries. The control variable for regime type has lacked significance in many of the models. The significant interaction term between remittances and non-OECD might indicate that regime type alone does not have an impact. It might be rather that the economic structure of a country and other ideological preferences might play an important role.

The non-OECD and Gini interaction term included is statistically insignificant. The lack of significance indicates that there is no difference between OECD and non-OECD states in how economic inequality influences the occurrence of transnational terrorists. Economic inequality increases the mobilization of transnational terrorists in both developed and less-developed countries.

4.1.3 Summary of transnational models

The main independent variables, remittances and economic inequality are significant across all models, with the coefficients remaining positive. These findings imply a possible use of remittances as an auxiliary source of terrorist funding, or at least that countries with high levels of remittance inflows experience increased numbers of transnational terrorists mobilizing. High levels of economic inequality are also associated with increased presence of transnational terrorists. This lends support to H_1 and H_4 .

The other economic variables also remain relatively stable, with both trade and FDI remaining significant and negatively associated with transnational terrorism. The GDP per capita was significant in the benchmark model, but its insignificance in model 2. GDP became insignificant once economic inequality was excluded, which might indicate that some of its explanatory power is a result of correlation with the economic inequality variable. Economic inequality is not dependent on GDP per capita, as it remains significant in model 5 even when GDP is excluded.

Table 4. Negative binomial regression. Domestic terrorist events, remittances and economic inequality. 1980-2005.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Remittances	0.002	0.008	-0.003	0.001	-0.003	0.000	0.039
GINI/ Economic inequality	0.015**		0.016**	0.016**	0.019**	0.017**	0.034**
Trade	-0.006**	-0.004*		-0.008***	-0.004**	-0.006**	-0.005**
FDI	-0.063***	-0.049***	-0.073***		-0.059***	-0.061***	-0.063***
$\ln\Delta(\text{GDP per capita})$	1.266**	1.379**	0.961*	1.191**		1.254**	1.194**
$\ln\Delta(\text{GDP per capita})^2$	-0.074**	-0.080**	-0.053	-0.068*		-0.071**	-0.068*
Ethnic fractionalization	-3.791**	-3.918**	-3.526**	-3.954**	-3.389**	-3.877**	-3.290**
Ethnic fractionalization ²	4.391**	4.298**	3.937**	4.696**	3.743**	4.348**	3.689*
Religious fractionalization	-3.896**	-3.044**	-4.020**	-4.050**	-3.411**	-4.074**	-4.509***
Religious fractionalization ²	4.808**	3.580**	4.946***	4.822**	4.379**	5.102**	5.726***
$\ln\Delta(\text{population size})$	0.174***	0.209***	0.231***	0.172***	0.164***	0.166***	0.158***
Ongoing conflict	0.968***	0.883***	0.845***	0.944***	0.813***	0.843***	0.859***
Previous event	0.020***	0.006***	0.006***	0.021***	0.006***	0.006***	0.006***
Regime	0.027	0.024	0.015	0.025	0.020	0.015	0.016
Africa	-0.733*	-0.084	-0.664*	-0.716*	-1.066**	-0.694*	-0.738**
America	-0.369	0.126	-0.308	-0.472	-0.396	-0.412	-0.125
Asia	-0.289	0.054	-0.403	-0.290	-0.565*	-0.327	-0.408
Europe	-0.140	0.096	-0.216	-0.212	-0.165	-0.147	-0.320
Non-OECD							-0.612
Non-OECD x remittances							-0.038
Non-OECD x GINI							-0.019
Constant	-8.360**	-9.007***	-8.572***	-8.126**	-2.879***	-8.752***	-8.106**
Observations	1924	2387	1963	1964	1981	1960	1960
Wald test (X_2)	647.61***	896.75***	836.63***	619.92***	657.67***	770.43***	894.42***

Note: OECD = Organization for Economic Cooperation and Development. *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$.

4.2 Domestic terrorism

Table 4 presents the empirical model for domestic terrorist events. Using the same modeling technique as the transnational models, models 2-7 will apply alternative model specifications to test the robustness of the results from model 1. Models 2-5 will sequentially exclude the economic variables to test how they correlate and impact the dependent variable, before controlling for endogeneity bias in model 6.

4.2.1 Benchmark model

The domestic terrorism count data is also overdispersed, evidenced by the dispersion parameter (delta) in the benchmark model at 61.4. To handle the overdispersion negative binomial regression is the correct choice for the domestic dependent variable as well.

The Wald test for the benchmark model is significant at the 1% level, indicating good model fit for the domestic benchmark model as well.

Remittances and economic inequality

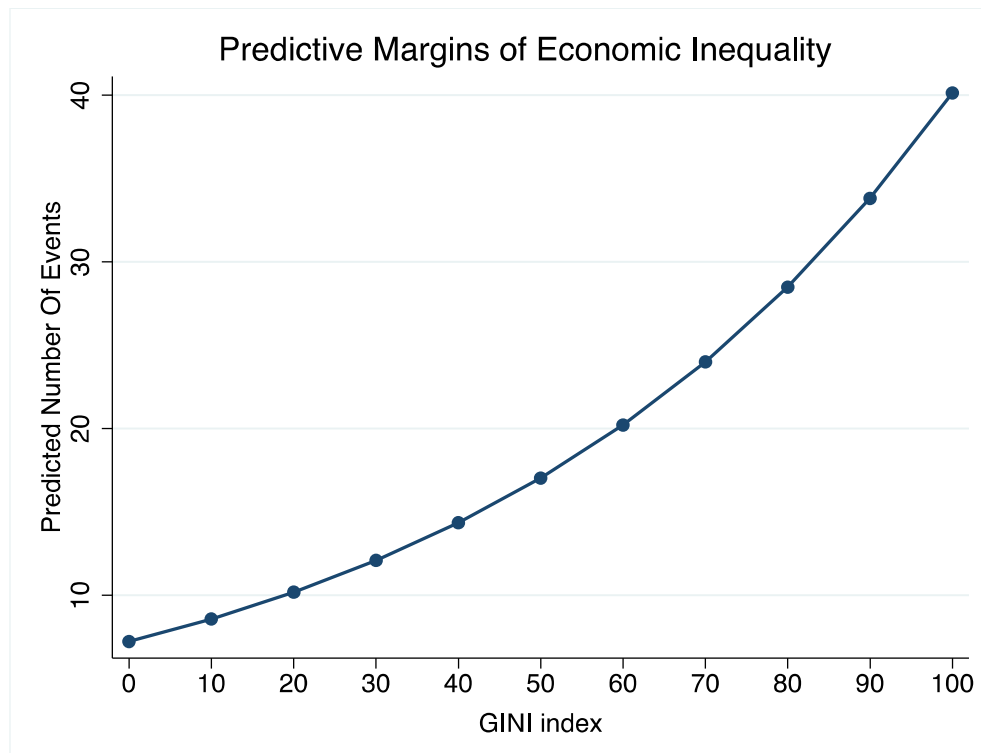
Moving on to the independent variables included in model 1, the lagged remittance coefficient (REMITTANCES) is positive but not significant, indicating that greater influxes of remittance funds are not associated with higher rates of domestic terrorist events. The lack of significance stands in contrast to what we expected to find and contradicts H₂. Based on the previous study done on remittances and domestic terrorism (Mascarenhas & Sandler 2013), a strong significant relationship between the two was expected. This was not found between remittances and domestic terrorist events. The lack of significance might be a result of the domestic terrorist groups structure and internal financing rather than financing from abroad.

Economic inequality (GINI) is positive and significant at the 5% level, supporting H₅. High levels of economic inequality are significantly related to higher expected domestic terrorism rates. A one-point increase on the Gini index leads to an estimated 2% increase in domestic terrorist attacks. While a 2% increase may appear to make only a minor impact, the effect would increase as the level of economic inequality. A 10-point slide on the Gini index would lead to an estimated 17% increase in domestic attacks.

These findings are lent credence in previous literature, which also found a significant link between high levels of economic inequality and increased domestic terrorist incidents

(Krieger & Meierrieks 2010; London and Robinson 1989; Muller and Seligson 1990). The significant relationship between the two also strengthens the role of relative deprivation as presented by Ted Gurr (1970). Relative deprivation in the form of economic inequality encourages increased domestic terrorism.

Figure 10. Margins plot: economic inequality

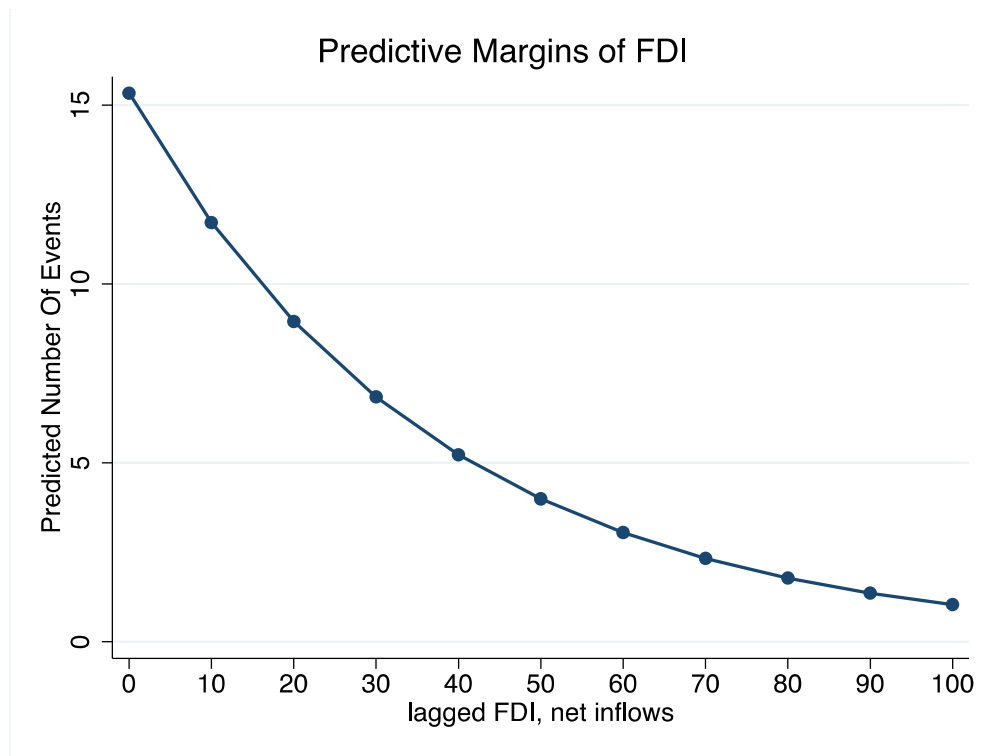


Other economic variables

Other economic factors, such as trade (TRADE) and foreign direct investment (FDI), are on the other hand negatively associated with domestic terrorist incidents. A country that partakes in the globalized economy through trade and foreign direct investments experience less domestic terrorism, indicating that deeper economic integration with other countries has a positive effect on decreasing domestic terrorism. For every 1% increase of trade as part of GDP, domestic terrorism incidences are reduced by 1%.

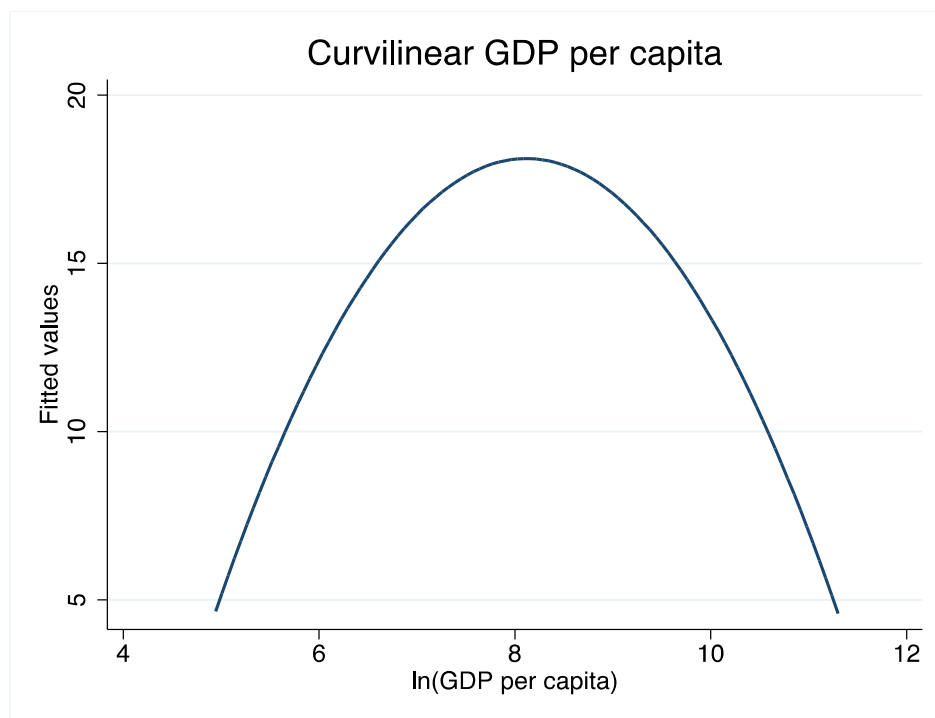
FDI decreases the expected domestic terrorism rates by 7% for every 1% increase of FDI into the economy (through GDP). Mascarenhas & Sandler (2013) argue that allowing for stronger ties between a country and the rest of the world is important in hindering domestic terrorism. By allowing globalization and deeper integration in vulnerable economies, there might be a decrease in domestic terrorist activity.

Figure 11. Margins plot: FDI



The log transformed GDP per capita (GDP) variable (and the squared term) is significant, suggesting a curvilinear relationship between economic development and domestic terrorist incidents. Poor countries that experience increased economic development will initially be vulnerable to domestic terrorists, at least in a transitional period. As the GDP continues to increase this effect weakens, before becoming significant in decreasing the occurrence of domestic terrorism.

Figure 12. Curvilinear graph: GDP per capita

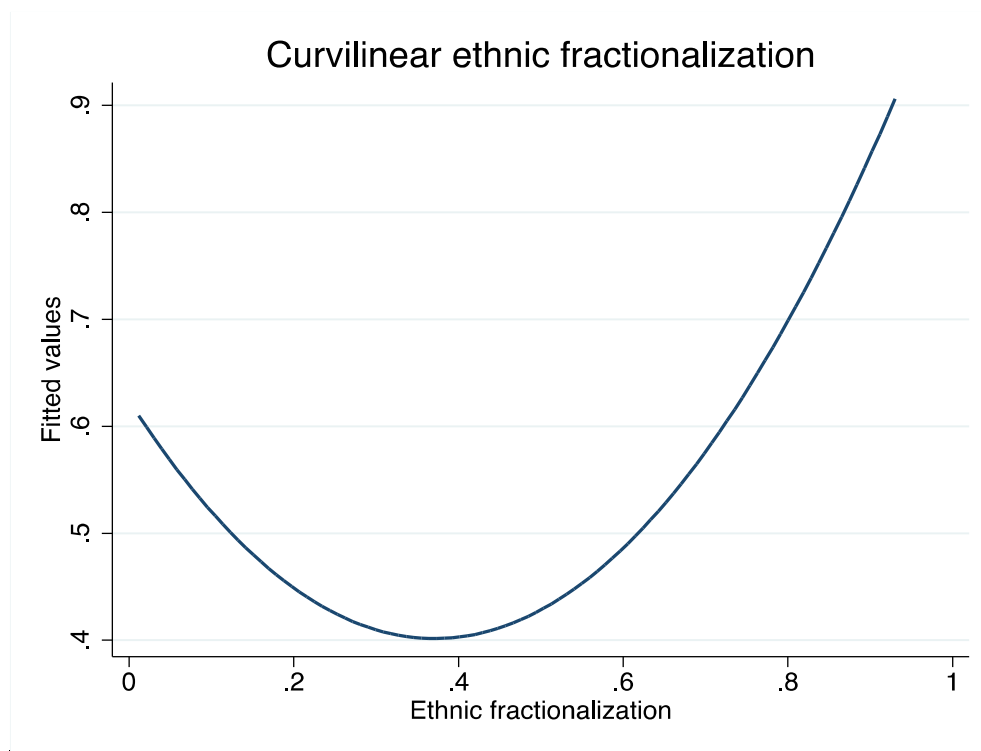


Control variables

Ethnic and religious fractionalization (ETHNIC/RELIGIOUS) both have a significant, curvilinear relationship with domestic terrorism. Religious fractionalization has nearly the exact same coefficient as ethnic fractionalization. Both the religious fractionalization variable and its squared term is significant, indicating the same curvilinear relationship with domestic terrorism as ethnic fractionalization had. Countries with many smaller minority groups, in effect extremely heterogeneous societies, have increased likelihood of domestic terrorist attacks.

These findings are also support by previous research, which found that ethnically heterogeneous countries have an increased risk of civil war (Hegre et al.1998; Ellingsen 2000). If we view civil war as another expression of political violence, there is reason to believe that countries with high ethnic heterogeneity are also at greater risk of domestic terrorism. The curvilinear nature of the relationship between ethnic and religious fractionalization and domestic terrorism corresponds with previous finding from Skjoldberg & Nordås (2007) and Malecková (2005).

Figure 13. Curvilinear graph: ethnic fractionalization



The graph shows the U-shaped curvilinearity of the relationship. The expected number of domestic incidences decreases as the ethnic fractionalization moves towards 0.4. This makes it clear that countries without a strong ethnic majority and without very fragmented ethnic minorities are less likely to experience domestic terrorism. But as a society becomes increasingly fractionalized the number of terrorist events is likely to rise sharply.

The size of a country's population (SIZE) is positively associated with increased domestic terrorist attacks. A 1% increase in the size of a country's population would give a 18% increase in the expected number of domestic terrorist events. This is consistent with prior expectations and conforms to Eyerman's (1998) expectation that countries with larger population are harder to police and it is therefore easier for terrorist groups to operate within them.

The ongoing conflict variable (CONFLICT) is also highly significant at the 1% level and positively associated with increased terrorist attacks. Countries with ongoing conflicts between groups are especially vulnerable to domestic terrorist attacks, with a 132% increase of expected domestic terrorist attacks within countries where an ongoing conflict is present.

Previous domestic attacks (EVENT) are statistically significant and positively associated with increased domestic terrorist attacks. States where terrorist activity already is present are at risk of persistent terrorist threat, while countries where terrorism is absent are likely to experience persistent absence. Li and Schaub theorize that this might be related to the rational behavior of a terrorist who would have greater difficulties and expenses in setting up operations in a country where terrorism is rare or non-existent previously (2004).

The regime variable (REGIME) is positive, but surprisingly not statistically significant. There are therefore no significant differences between democracies or autocracies when it comes to numbers of domestic terrorist events. While there are disagreements between the political access and the resource mobilization school of thought on whether democracies are conducive for increased or decreased terrorist attacks the results do not conform to either. The possibility of a curvilinear relationship, as suggested by Abadie (2004) has also been controlled for, without generating any statistically significant results. The lack of significance might also be explained simply by weak explanatory power, which renders the regime variable insignificant when other more important explanatory variables are present.

The regional variables do not suggest any major geographical patterns when it comes to the occurrences of domestic terrorism. The MENA region is used as the reference group in the domestic models as well. Initially there seems to be no significant difference in the expected domestic terrorist attacks. The MENA region, America, Asia and Europe experience the same levels of terrorism, with only Africa experiencing fewer attacks. While the GTD Index (2012) and the Li and Schaub study found significant regional differences these have not manifested in the benchmark model. The lack of significance between the Middle East, America, Asia and Europe might be a result of the long time period and shifts in areas of instability. Cumulative, there are no significant differences between these four continents, but Africa experiences 50% fewer expected domestic attacks than the MENA region.

4.2.2 Model variations and robustness checks

Model 2 excludes economic inequality, but the results are largely unchanged from the benchmark model. The remittance variable remains insignificant. The other economic variables also remain unchanged, with trade and FDI decreasing the expected number of domestic terrorism. GDP per capita remains curvilinearly related to domestic terrorism.

The control variables remain largely unchanged as well, with the exception of the regional dummy for Africa and the regime variable. In model 1 Africa was the only region with a significantly lower expected rate of domestic terrorism. When economic inequality is removed so is the weak significance found in the benchmark model, indicating that the explanatory power of the regional variable was linked to economic inequality. The regime variable becomes significant at the 5% level when economic inequality is excluded. The explanatory power of regime is weak as it is not present in model 1, but once economic inequality is not included it becomes significant.

Excluding the trade variable in MODEL 3 also removes the explanatory power of economic development (in the form of GDP). The GDP per capita variables previously significant curvilinear relationship with domestic terrorism is no longer present, indicating some degree of collinearity between trade and GDP per capita. This makes the statistical inferences made on trade and GDP per capita unreliable. The FDI remains statistically significant and negatively related to domestic terrorism, indicating that the results obtained in model 1 are correct.

The two main independent variables, remittances and Gini, remain largely unchanged. Remittance inflows are still not a significant, while higher economic inequality is still associated with higher numbers of expected domestic terrorism. The inferences made on the control variables in model 1 remain unchanged and the regime variable that was significant in model 2 is once again insignificant.

The FDI variable is excluded in MODEL 4. Remittance inflows remain insignificant, while economic inequality is still significant and positively related to domestic terrorist attacks. The control variables are all statistically unchanged, with only minor changes to the coefficients.

For MODEL 5 the GDP per capita variable (and its squared term) is excluded from the model. Both the remittance variable and economic inequality remain consistent with previous findings. The remittance variable remains insignificant, while economic inequality is still significant and the coefficient changes only slightly from model 1. Both trade and FDI remain consistent with the results from model 1.

The removal of the GDP variables strengthens the explanatory power of the regional dummy variables. Africa has been negatively associated with domestic terrorism. When GDP per capita is removed as an explanatory variable, Asia also becomes significant and negative. When the GDP per capita is excluded it is significant at the 10% level. Both America and Europe remain insignificant.

The possibility of an endogeneity bias is also present when studying remittances and economic inequality in relation to domestic terrorism. MODEL 6 has therefore applied the same fixed-effect method seen in the transnational terrorism models previously. Using the same predicted values garnered from the fixed-effects model in the transnational models, model 6 substitutes the remittance variable with the predicted values. The results indicate that the inferences made in model 1 are not influenced by endogeneity, as the findings are consistent with those in the benchmark model. Remittances remains insignificant, while high economic inequality has a positive relationship with expected increased domestic terrorism. The significance levels of all control variables remain the same, with only minor changes to the coefficients. There are therefore no indications that the results obtained from the benchmark model are sensitive to an endogenous relationship between remittances and economic inequality.

MODEL 7 controls for the same interactions that were included in the transnational model. The remittances and non-OECD interaction term is included but not significant. As the remittance variable did not indicate any impact on the occurrence of domestic terrorism in the previous six models, this is expected. The economic inequality and non-OECD variable is not significant either, indicating that the impact of economic inequality on domestic terrorism does not differ between OECD and non-OECD countries. Any differences in impact between developed and less-developed countries are therefore only apparent when looking at transnational terrorists.

4.2.3 Summary of domestic models

The remittance variable is insignificant across all 7 domestic models. The lack of significance was surprising and did not correspond with H₂. This contradicts the findings by Mascarenhas and Sandler (2013), but can possibly be explained by the financial structure of domestic terrorist groups. Domestic terrorist groups differ from transnational terrorist groups such as

Al-Qaeda, in that they rely mainly on internal revenue funding, rather than support from abroad (Fenstermacher et al. 2010). Domestic terrorist groups have limited interest outside their own borders and funding would therefore be focused locally rather than abroad. If the funding is internal rather than external, remittances will not have any significant impact on the occurrence of domestic terrorism. Economic inequality is on the other hand significant across all model specifications, resulting in strong support for H₅; economic inequality is a significant determinant of domestic terrorism

4.3 Alternative models with year dummies

The models in table 3 and 4 have model specifications aimed at controlling the robustness of the results. To further ensure these results we have included more extensive statistical controls to alternative models. The results can be seen in Table 6 and 7 (see Appendix.6-7). Dummy variables for all years have therefore been included to test for these potential year-specific effects. The inclusion of year dummies in these models was done to prevent spurious findings (Li & Schaub 2004; Dougherty 2002). Their inclusion might possibly create high levels of collinearity, but should still be included to see whether the findings in the benchmark models are robust. The results differ only slightly from the original results, with the inferences made on the main independent variables remaining unchanged. Trade becomes insignificant in dummy models but this might be explained by the fact that the year dummies steal a lot of the explanatory power, which has been evidenced before (Li & Schaub 2004).

4.4 Main findings

Remittances are found to have significant explanatory power on the occurrence of transnational terrorist and are positively associated with higher expected numbers of transnational terrorism across all models, indicating a great degree of robustness. This supports H₁. In the case of domestic terrorism the remittance variable is not significant in any of the seven statistical models. There is therefore no indication of a significant causal relationship between remittances and domestic terrorism, which dissuades support for H₂. The lack of support for H₂ gives support to H₃; as no significant relationship can be detected between domestic terrorism and remittances, the relationship between transnational terrorism and remittances will necessarily have stronger explanatory power. The lack of significance between remittances and domestic terrorism is surprising, as the previous quantitative study conducted by Mascarenhas and Sandler (2013) on domestic terrorism and remittances had

found a significant relationship between them. The discrepancy might be explained by the difference in year parameters and the fact that domestic terrorism is often funded internally, rather than by external sources (Fenstermacher et al. 2010).

Table 5 Summary of hypotheses results

Hypotheses	Supported	Unsupported	Table
H ₁ Remittances into a country have a significant impact on the number of transnational terrorists.	X		3
H ₂ Remittances into a country have a significant impact on the number of domestic terrorist attacks.		X	4
H ₃ The explanatory power of remittances will be strongest in the transnational models.	X		3
H ₄ High economic inequality within a country increases the number of transnational terrorist events stemming from that country.	X		3
H ₅ High economic inequality increases the number of domestic terrorist attacks.	X		4

Economic inequality was significantly associated with higher expected numbers of terrorism across all statistical models, both transnational and domestic. These findings give credence to H₄ and H₅ and support the hypothesis that economic inequality influences the occurrence of both domestic and transnational terrorism. These results are in accordance with previous studies that have found a significant association between terrorism and vertical inequalities such as economic inequality (Muller & Seligson 1990; London & Robinson 1989).

The results from the other economic variables such as trade, FDI and GDP per capita are not as unambiguous as the main independent variables. The alternative models in Table 6 and

Table 7 found a lack of significance for the trade variable when possible spurious time effects were controlled for. In the original models trade and foreign direct investments had a negative impact on the occurrence of terrorism, but this was less pronounced when the time dummy variables were included (see Appendix A.6-7). Trade was no longer significant, while foreign direct investment was only significant when studying domestic terrorist events. Investments into terrorist prone countries could therefore be a useful strategy in decreasing domestic terrorism, but is unlikely to yield results when looking at decreasing transnational terrorist and terrorist groups. A rise in economic development, in the form of increased GDP per capita, is also unlikely to detract transnational terrorists, but will in the long run decrease the number of domestic terrorist events.

Fractionalization of ethnic and religious groups had a greater impact on domestic terrorists than on transnational ones. Countries with neither a homogenous nor heterogeneous minority demographic will experience less domestic terrorism, but increasingly fractionalized societies will experience a sharp rise in the number of domestic terrorism. Religious fractionalization experiences the same curvilinear relationship with the number of domestic attacks; a society that is neither religiously totally homogenous nor totally heterogeneous is less likely to experience domestic terrorist attacks. Religious fractionalization also has an impact on the occurrence of transnational terrorism.

The sensitivity of the benchmark models was controlled for in subsequent models, in an attempt to alleviate any uncertainty about the original inferences. The economic control variables and other control variables are consistent with previous studies and literature and the results of consistent across models, with only minor changes. To ensure that the findings for remittances and economic inequality are not influenced by an endogenous relationship, both statistical models have controlled the robustness of their benchmark models and included a check for possible endogeneity bias. As no such bias was found in either model, the inferences drawn from the benchmark models seem correct.

The regime variable was not significant in any of models, giving little credence to the idea that regime characteristics has an impact on terrorist events. The existence of a curvilinear relationship has also been controlled for. While no significant relationship was found between regime type and terrorist events alone, the interaction terms included in model 7 present some interesting finds. The interaction term for remittances and non-OECD countries is significant

in the transnational models. As seen in Fig.9 it becomes clear that the potential effect of remittances on terrorism is strongest in OECD countries. Based on the criteria for OECD membership it would seem that democratic regimes with free market economies are more vulnerable to the impact of remittances, than non-OECD countries. This demonstrates that the economic structure and ideological model of a country might influence the impact of remittances inflows on terrorists, rather than regime type alone.

5 Conclusion

This thesis has studied the impact of remittances and economic inequality on terrorist events, both transnational and domestic. It began with a short look at the two main theoretical approaches: the deprivation school and the rational actor school. These two theories were subsequently connected to the ongoing discussion on “greed versus grievance” driven terrorism and how they relate to remittances and economic inequality. With remittances representing the greed and RA argument and economic inequality representing the grievance and DA argument.

This was followed by a conceptualization of terrorism, remittances and economic inequality as academic terms, before studying the shifting view on remittances: from a potential form of development aid to a possible source of funding for terrorism. Remittances are a substantial source of external capital, and play a central part in the economies of low-income countries. The lack of solid remittance data has created a lacuna in studies on remittances and their impact on both transnational and domestic terrorism, with the exception of Mascarenhas and Sandler’s study (2013). The thesis developed further on their findings by studying the impact of underlying economic inequality, in addition to remittance inflows.

Based on a review of relevant literature, five hypotheses were formulated. To be able to answer these hypotheses the thesis applied a time series cross-sectional analysis. The application of count data modeling is common in criminology related studies and was also adopted for this thesis. Using negative binomial estimation enabled us to observe how remittance inflows and existing inequality within a country affected the number of terrorist events.

The results were highly dependent on whether the model was featuring transnational or domestic events. Both remittances and economic inequality were significantly associated with transnational terrorist mobilization, giving support to H_1 and H_4 . Domestic terrorism is significantly associated with economic inequality, but there are no indications of a significant relationship between domestic terrorism and remittance inflows, dissuading H_2 but giving support to H_3 and H_5 . The findings have also been controlled, by running sensitivity analysis in the form of alternative models and robustness checks on the benchmark models. Fixed-

effects models and endogenization were also applied to control for endogeneity bias amongst the main independent variables.

This thesis has contributed to our understanding of terrorism in the following ways. First it builds a theoretical foundation based on a variety of disciplines, ranging from criminology, psychology and history to economics, and of course political science. The theory developed for this thesis is original and novel. Second, by using new data, gathered from a variety of sources such as the World Bank, ITERATE, GTD, SWIID and the Polity IV dataset, I have been able to construct large- n dataset on terrorism, remittances and inequality. The use of these data and the introduction of new explanatory factors have also been central to develop further on the Sandler and Mascarenhas study (2013). The role of remittances in terrorist mobilization is understudied, and the thesis has contributed to further our understanding by also applying variable controls for causality and endogeneity issues related to the inequality and remittances variables. Lastly, the thesis has paid detailed and careful attention to the research design, which has resulted in robust findings that support some of Sandler and Mascarenhas earlier findings, as well as dissuade some of them.

5.1 Implications

The findings are interesting and indicate that further study is needed on the end use of remittances. The results from domestic model contradict the results of previous studies on remittances and terrorism. The lack of significant association between remittances and domestic terrorism could possibly be explained by domestic terrorism being funded locally, rather than by international backers. Meanwhile, the transnational models found significant explanatory power in the remittance variable. Any definite conclusions based on this are difficult to ascertain, but the findings indicate that there is a very real possibility of a connection between remittance inflows and transnational terrorist events. The connection between terrorism and remittance inflows is tenuous, but there is enough evidence to warrant further studies on remittances as funding for transnational terrorism. The lack of micro level data on the end use of remittances is problematic and it will be necessary with further studies as better micro data on remittances becomes available.

The interaction between inequality and group identity (i.e. horizontal inequalities), has not been studied as a part of the thesis, but should in future studies be investigated. Fractionalized

societies are not necessarily problematic by themselves, but it is rather the existence of severe inequalities in some of these groups that leads to polarization and possible conflict. There exist different distributional indicators for ethnic and religious groups: fractionalization, polarization and Lorenz domination (Esteban & Ray 2008). This thesis has focused on fractionalization. Future studies should seek to expand on this and study the interactions between for example Lorenz dominance/income inequality and polarization. The effect of inequality in resource access coinciding with group divisions should be further explored, as well as how different forms of inequality interact with remittances and terrorist events.

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Appendix

A.1 Variables and sources

The following independent variables were used as a foundation for the statistical models of the thesis and the graphs presented within the text:

The World Bank, World Development Indicators (2013):

- Workers' remittances, received (% of GDP)
- (Trade) Exports of goods and services (% of GDP)
- (Trade) Imports of goods and services (% of GDP)
- Foreign direct investment, net inflows (% of GDP)
- GDP per capita (constant 2005 US\$)
- Population, total

The Standardized World Income Inequality Database:

- Gini index

Uppsala Armed Conflict Database:

- Number of conflicts

Fractionalization data:

- Ethnic fractionalization
- Religious fractionalization

The Polity IV Project:

- Polity 2

A.2 Excluded squared terms from benchmark model

<i>Variables</i>	Transnational	Domestic
Remittances	0.035**	0.006
GINI	0.020**	0.0149*
Trade	-0.013**	-0.003
FDI	-0.084**	-0.025*
<i>ln</i> (GDP per capita)	1.319	1.439**
<i>Ln</i> (GDP per capita ²)	-0.069	-0.080**
Ethnic fractionalization	-2.030	-3.960**
Ethnic fractionalization ²	2.048	4.376**
Religious fractionalization	-3.375**	-3.550**
Religious fractionalization ²	3.231**	4.361**
<i>Ln</i> (population size)	0.112	0.250***
Conflict	0.728***	1.089***
Event	0.027***	0.006***
Regime	-0.013	0.045**
Regime ²	-0.000	-0.003
Africa	-1.166**	-0.530
America	-0.632*	-0.410
Asia	-0.590*	-0.506*
Europe	-0.462	-0.214
Constant	-8.449*	-12.047***

*** Significant at the 1% level **Significant at the 5% level *Significant at the 10% level

A.4 Tolerance

To test for multicollinearity amongst the X variables we run a multiple regression. As the tolerance test is only testing the X-variables it does not matter that the dependent variable is a count variable. Tolerance values:

Variables	Tolerance values excluded polynomial terms
Remittances	0.833
Trade	0.548
FDI	0.822
GDP per capita	0.504
GDP per capita ²	-
Ethnic fractionalization	0.581
Religious fractionalization	0.846
Conflict	0.864
Event	0.927
Regime	0.716
Total population size	0.622
Interaction term	-
Gini	0.581

The *tolerance* value of each independent variable represents the proportion of the variance not shared with the other independent variables. If the tolerance values fall beneath .2 or .1, the analysis is considered less stable (Hamilton 1992). By including interaction terms

A.5 Fixed-effects model

	<i>Two-Way Fixed-Effects Model</i>
GINI	-0.0078 (-1.47)
Trade	-0.0011 (-0.40)
FDI	0.0181 (1.14)
Remittances _{t-1}	0.8687*** (40.46)
Constant	1.0836** (2.69)
Observations	2,202
R ²	0.973

NOTE: Robust z statistics, adjusted over countries, in parentheses. Coefficients for country and year dummies not shown. **Significant at the 5% level. ***Significant at the 1% level.

A.6-7 Alternative models with year dummies

Table 6 Alternative transnational models with year dummies

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Remittances	0.030**	.027***	0.025**	0.030**	0.028**		0.031**
GINI	0.030**		0.029**	0.029**	0.025**		0.024**
Trade	-0.006	-0.004		-0.007	-0.007		-0.006
FDI	-0.028	-0.033**	-0.040		-0.029		-0.031
$\ln\Delta$ (GDP per capita)	0.152*	0.060	0.143	.155*			0.228*
Ethnic fractionalization	-0.030	0.107	-0.097	-0.028	-0.023		0.011
Religious fractionalization	-3.7956**	-2.491**	-3.693**	-3.753**	-3.268**		-4.107*
Religious fractionalization ²	3.612**	2.000	3.382**	3.488**			4.038*
$\ln\Delta$ (population size)	0.207**	0.252***	0.292***	0.207**	0.207**		0.203**
Ongoing conflict	0.846***	0.962***	0.871***	0.863***	0.818***		0.879***
Previous event	0.029***	0.029***	0.029***	0.029***	0.029***		0.029***
Regime	0.010	0.015	0.011	0.009	0.019		0.010
Africa	-1.437**	-0.937**	-1.281**	-1.409**	-1.654***		-1.363**
America	-0.681*	-0.190	-0.536	-0.703*	-0.728**		-0.692*
Asia	-1.057**	-0.890**	-1.083**	-1.063**	-1.270***		-0.977**
Europe	-0.498	-0.431	-0.485	-0.522	-0.400		-0.498
OECD							-0.929
OECD x remittances							0.079
OECD x GINI							0.017
Constant	-7.452***	-6.335***	-9.128***	-7.391***	-5.890***		-7.861***
Observations	2001	2426	2003	2041	2022		2001
Wald test (X_2)	1042.42***	856.48***	944.14***	1072.69***	850.18***		1106.91***

Note: Coefficients for year dummy variables are not shown. *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$

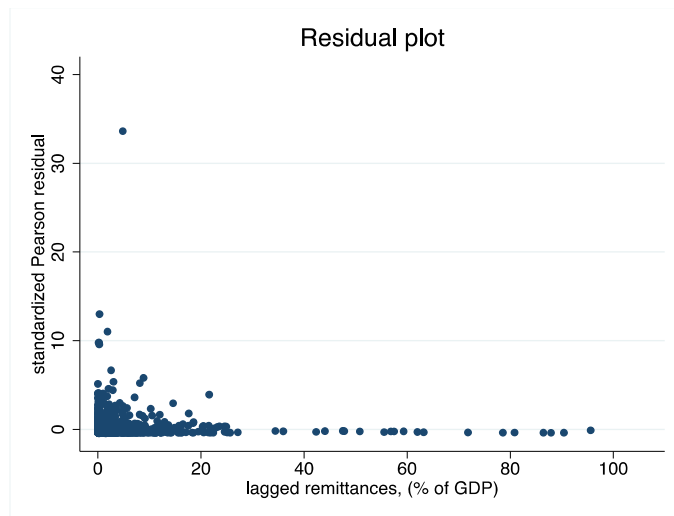
Table 7. Alternative domestic models with year dummies

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Remittances	0.006	0.011	0.004	0.005	0.000		0.007
GINI	0.017**		.016**	0.017*	0.019**		0.011
Trade	-0.003	-0.001		-0.004*	-0.002		-0.003
FDI	-0.027*	-0.035***	-0.032***		-0.026*		-0.029**
$\ln\Delta(\text{GDP per capita})$	1.578**	1.676**	1.453*	1.611**			1.478**
$\ln\Delta(\text{GDP per capita})^2$	-0.089**	-0.097**	-0.082	-0.091**			-0.083**
Ethnic fractionalization	-3.977**	-3.938**	-3.832**	-4.084**	-3.374*		-2.697
Ethnic fractionalization ²	4.436**	4.346**	4.279**	4.529**	3.728		2.946
Religious fractionalization	-3.655**	-2.548*	-3.328**	-3.541**	-2.883		-4.2609**
Religious fractionalization ²	4.499**	2.924*	4.407**	4.349**	3.635		5.334**
$\ln\Delta(\text{population size})$	0.245***	0.292***	0.281***	0.238***	0.229***		.2238***
Ongoing conflict	1.112***	1.139***	1.114***	1.103***	1.077***		1.1436***
Previous event	0.006***	0.006***	0.006***	0.006***	0.006***		0.006***
Regime	0.036**	0.045***	0.036**	0.035**	0.039**		0.042**
Africa	-0.526	0.038	-0.493	-0.548	-0.955**		-0.617
America	-0.400	0.090	-0.345	-0.468*	-0.372		-0.471*
Asia	-0.508*	-0.196	-0.537**	-0.539**	-0.797**		-0.525**
Europe	-0.198	0.003	-0.212	-0.245	-0.207		-0.167
OECD							-1.382**
OECD x remittances							-0.046
OECD x GINI							0.039**
Constant	-12.763***	-13.206***	-12.995***	-12.673***	-5.371***		-11.723***
Observations	1960	2387	1963	2002	1981		1960
Wald test (X_2)	18932.54***	20789.03***	17663.88***	18888.60***	17833.09***		19528.47***

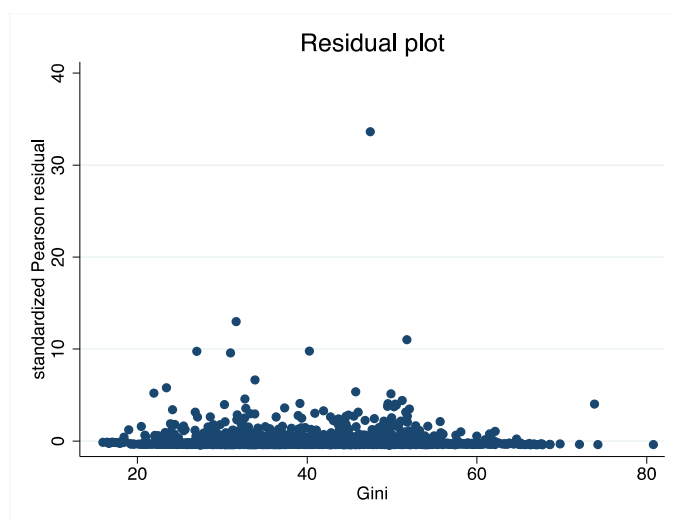
Note: Coefficients for year dummy variables are not shown. *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$

A.8- 11 Pearson's residuals

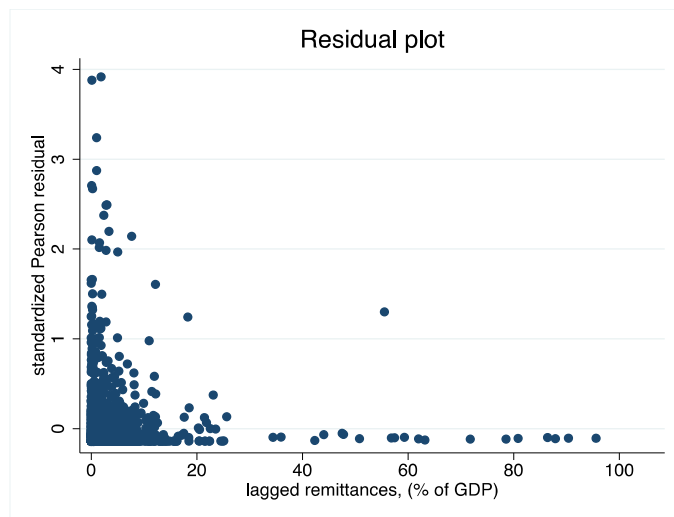
Transnational residual plot: remittances



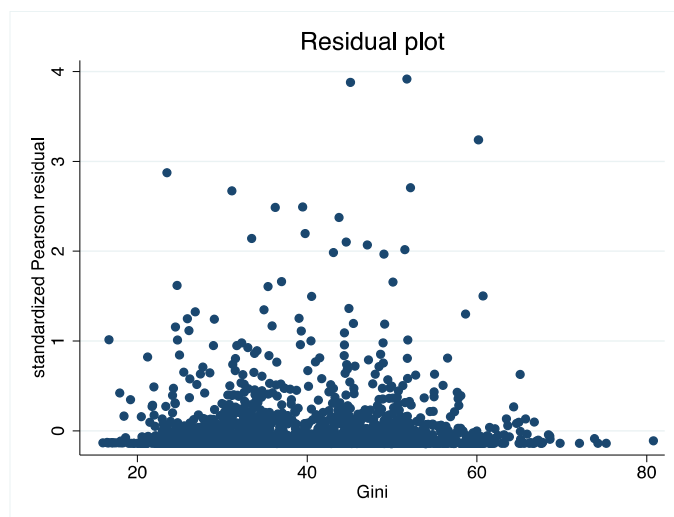
Transnational residual plot: Gini



Domestic residual plot: remittances



Domestic residual plot: Gini



A.12 List of countries in the estimation sample

Afghanistan	East Timor	Macao SAR	South Korea
Albania	Ecuador	Macedonia	Spain
Algeria	Egypt	Madagascar	Sri Lanka
Andorra	Egypt	Malawi	St. Kitts and Nevis
Angola	El Salvador	Malaysia	St. Lucia
Antigua &	Equatorial Guinea	Maldives	Sudan
Barbuda	Eritrea	Mali	Suriname
Argentina	Estonia	Malta	Swaziland
Armenia	Ethiopia	Mauritania	Sweden
Australia	Fiji	Mauritius	Switzerland
Austria	Finland	Mexico	Syria
Azerbaijan	France	Moldova	Taiwan
Bahamas	Gabon	Mongolia	Tajikistan
Bahrain	Gambia	Montenegro	Tanzania
Bangladesh	Georgia	Morocco	Thailand
Barbados	Germany	Mozambique	Togo
Belarus	Ghana	Myanmar	Trinidad and
Belgium	Greece	Namibia	Tobago
Belize	Grenada	Nepal	Tunisia
Benin	Guatemala	Netherlands	Turkey
Bhutan	Guinea	New Zealand	Turkmenistan
Bolivia	Guinea-Bissau	Nicaragua	Uganda
Bosnia and	Guyana	Niger	Ukraine
Herzegovina	Haiti	Nigeria	United Arab
Botswana	Honduras	North Korea	Emirates
Brazil	Hong Kong SAR	Norway	United Kingdom
Brunei	Hungary	Oman	United States of
Bulgaria	Iceland	Pakistan	America
Burkina Faso	India	Palestinian	Uruguay
Burundi	Indonesia	Territories	Uzbekistan
Cambodia	Iran	Panama	Vanuatu
Cameroon	Iraq	Papua New Guinea	Venezuela
Canada	Ireland	Paraguay	Vietnam
Central African	Israel	Peru	Yemen
Republic	Italy	Philippines	Zambia
Chad	Ivory Coast	Poland	Zimbabwe
Chile	Jamaica	Portugal	
China	Japan	Qatar	
Colombia	Japan	Romania	
Comoros	Jordan	Russia	
Congo	Kazakhstan	Rwanda	
Costa Rica	Kenya	Samoa	
Croatia	Kosovo	Saudi Arabia	
Cuba	Kuwait	Senegal	
Cyprus	Kyrgyzstan	Serbia	
Czech Republic	Laos	Seychelles	
Democratic	Latvia	Sierra Leone	
Republic of the	Lebanon	Singapore	
Congo	Lesotho	Slovakia	
Denmark	Liberia	Slovenia	
Djibouti	Libya	Solomon Islands	
Dominican	Lithuania	Somalia	
Republic	Luxembourg	South Africa	

